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NAVAL PROFESSIONAL PAPERS
No. 19

THE
VARIATION OF THE COMPASS

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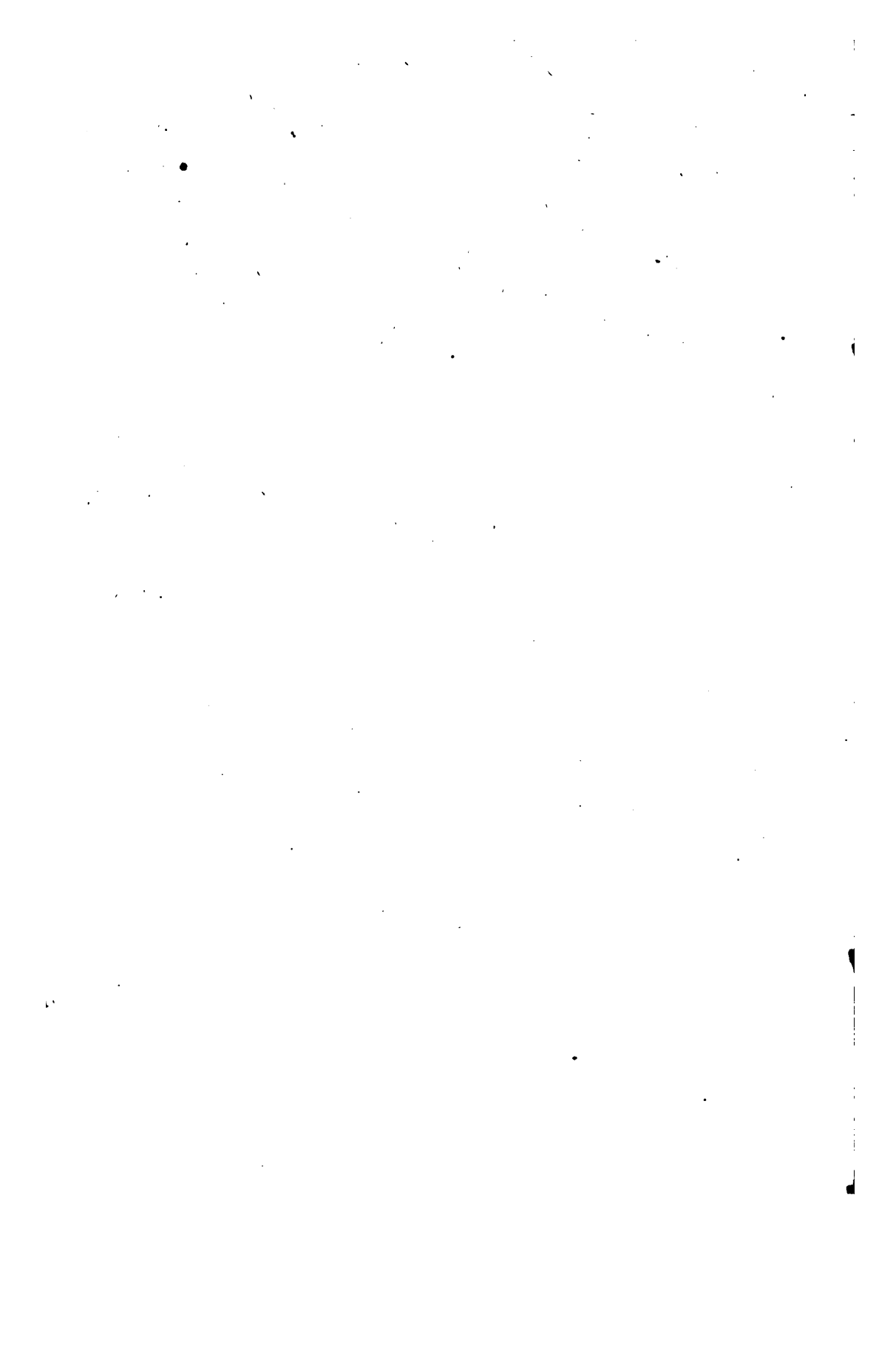
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NAVAL PROFESSIONAL PAPERS: No. 19.

THE
Variation of the Compass,

as determined in various parts of the World
(chiefly at Sea), by Officers of the United
States Navy, while Navigators of
Ships, between the Years
1881 and 1885.

BUREAU OF NAVIGATION,
NAVY DEPARTMENT.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1886.

PREFACE.

The observations of the variation of the compass in this volume have been made in different parts of the world by officers of the U. S. Navy while Navigators of vessels, and extend through a period of four years—since 1881.

Every care has been taken to insure their accuracy and trustworthiness; the instruments used (the compass and azimuth circle) have been tested and inspected before being issued to ships; the Form of Report was devised with the special view of affording all the information possible that would conduce to a correct judgment of the character of the observations; the examination of the observations and their compilation in the Office of Superintendent of Compasses have been done with the sole object of excluding error and giving data of the closest approximation to the truth.

Only those observations which bore the evidence of care on the part of observers, and had circumstances favorable to accuracy, are published. In every instance the character of the original observation is still dependent upon the observer, and he is responsible for it; the Bureau only undertakes to select (in its opinion) the best, and have them correctly compiled.

As, in the original observation, the Variation of the locality and the Deviation proper to the course the ship was heading are combined, in order to obtain the Variation correctly, it became necessary to know the Deviation accurately; and, to this end, the vessel was turned in a circle at frequent intervals during the voyage, and new Tables of Deviation obtained in the manner required by the Report. A sample of the Report is bound in the back of this book. The case of the U. S. S. Pensacola, Captain Henry Erben, will illustrate the whole. This ship, being on the West Coast of South America, received orders to return home *via* the Cape of Good Hope. During her passage around the world, in compliance with specific instructions from the Bureau, an excellent series of observations for Variation was obtained, and Tables of Deviation were determined previous to sailing and *en route* as follows:

Dec. 14, 1882, off Callao, Peru; Jan. 17, 1883, at sea in Lat. $1^{\circ} 36' N.$ and Long. $80^{\circ} 53' W.$; April 11, 1883, off Coquimbo, Chili, Lat. $29^{\circ} 55' S.$, Long. $71^{\circ} 19' W.$; July 24, 1883, at sea in Lat. $7^{\circ} 26' S.$, Long. $107^{\circ} 38' W.$; Aug. 9, 1883, at sea in Lat. $12^{\circ} 29' N.$, Long. $136^{\circ} 02' W.$; Aug. 19, 1883, off Honolulu in Lat. $21^{\circ} 10' N.$, Long. $157^{\circ} 54' W.$; Sept. 16, 1883, at sea in Lat. $20^{\circ} 03' N.$, Long. $174^{\circ} 34' E.$; Oct. 23, 1883, off the coast of Japan in Lat. $34^{\circ} 42' N.$, Long. $139^{\circ} 10' E.$; Dec. 9, 1883, off Singapore in Lat. $1^{\circ} 16' N.$, Long. $104^{\circ} 16' E.$; March 7, 1884, off Cape of Good Hope in Lat. $33^{\circ} 40' S.$, Long. $17^{\circ} 39' E.$; April 2, 1884, at sea in Lat. $7^{\circ} 45' S.$, Long. $19^{\circ} 20' W.$; April 25, 1884, at sea in Lat. $17^{\circ} 0' N.$, Long. $59^{\circ} 31' W.$; and lastly, May 10, 1884, just before entering Chesapeake Bay, in Lat. $36^{\circ} 54' N.$, Long. $75^{\circ} 45' W.$

With all these Tables of Deviations before the compiler, it is evident that he has the fullest and most accurate information possible for correctly estimating the devi-

ation to be applied to any compass error determined *en route*, in order to separate the Deviation from the Variation. And such was the case with every vessel whose observations are given herein. In addition, the vessels being wooden, in which the deviations were always small and changed but little, there was an additional source of accuracy in the results.

The variations obtained from the observations made to determine a Table of Deviations are unquestionably reliable—probably the closest approximations that can be had. They are printed in heavy-faced type to distinguish them, and while the others resulting from an observation on a single course are not considered final, still they are deemed highly trustworthy on account of the great care exercised in the various processes to reach them.

All are published that immediate use may be made of them, and such is intended to be the practice from time to time, until a sufficient number are accumulated for the final revision and publication of a Variation Chart of the World.

In the present volume the Variations are arranged in zones of five degrees of latitude, without reference to longitude.

As the present endeavor to systematize and publish the observations for the Variation of the Compass has proved so satisfactory and successful during the past four years, it is hoped that the results obtained will have the effect of causing Commanding Officers to select opportunities, and to encourage navigators to continue the observations in future.

BUREAU OF NAVIGATION,

NAVY DEPARTMENT, WASHINGTON,

July 22, 1885

THE VARIATION OF THE COMPASS.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Aug. 1, 1883 -----	0° 01'	30° 59' W.	14° 07' W.
Sept. 3, 1883 -----	0 00	105 09 E.	2 01 E.
Aug. 2, 1883 -----	0 01	127 57 W.	5 52 E.
Aug. 16, 1883 -----	0 04	73 52 E.	0 38 W. <i>a</i>
Dec. 4, 1884 -----	0 06	29 46 W.	15 12 W.
Feb. 17, 1883 -----	0 08	26 05 W.	19 07 W.
Jan. 18, 1883 -----	0 12	80 53 W.	6 32 E.
June 2, 1883 -----	0 36	131 42 W.	7 54 E.
March 13, 1885 -----	0 44	80 21 W.	6 24 E.
Aug. 1, 1883 -----	0 51	31 04 W.	15 29 W.
May 25, 1884 -----	1 07	57 45 E.	2 21 W.
Dec. 9, 1883 -----	1 16	104 16 E.	2 27 E. <i>a</i>
June 3, 1883 -----	1 20	132 43 W.	7 32 E.
Aug. 3, 1883 -----	1 28	128 48 W.	6 09 E.
Jan. 17, 1883 -----	1 36	80 53 W.	5 33 E. <i>b</i>
March 14, 1885 -----	1 44	79 43 W.	6 30 E.
Dec. 5, 1884 -----	2 0	30 46 W.	14 32 W.
May 26, 1884 -----	2 09	57 09 E.	2 52 W.
Jan. 17, 1883 -----	2 11	80 55 W.	5 43 E.
Aug. 3, 1883 -----	2 15	129 27 W.	6 03 E.
April 11, 1884 -----	2 39	35 25 W.	13 59 W.
April 25, 1884 -----	2 51	105 05 E.	3 26 E.
Dec. 5, 1884 -----	2 59	31 10 W.	13 31 W.

a = Mean of observations on 16 equidistant points.

b = " " " " 8 " "

From the Equator to 5° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Galena -----	Lt. H. W. Lyon -----	Lt. Diehl.
“ Juniata -----	“ E. H. C. Leutze -----	“ Diehl.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Enterprise -----	“ G. A. Norris -----	“ G. A. Norris.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Enterprise -----	“ G. A. Norris -----	“ Hubbard.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Diehl.
“ Wachusett -----	“ B. S. Richards -----	“ Scott.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Richmond -----	Lt. Comd'r Houston -----	“ Diehl.
“ Pensacola -----	Lt. F. Hanford -----	“ F. Hanford.
“ Essex -----	“ W. H. Parker -----	“ Diehl.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Wachusett -----	“ B. S. Richards -----	“ Scott.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Richmond -----	Lt. Comd'r Houston -----	“ Diehl.
“ Pensacola -----	Lt. F. Hanford -----	“ Diehl.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Trenton -----	“ A. Walker -----	“ Diehl.
“ Essex -----	“ W. Kellogg -----	“ Scott.

North Latitude:

[illegible]

8

a = Mean of observations on 4 equidistant points.

b= " " " " 16 " "

From the Equator to 5° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex -----	Lt. W. H. Parker -----	Lt. Diehl.
“ Richmond -----	Lt. Com. E. S. Houston -----	“ Hubbard .
“ Enterprise -----	Lt. G. A. Norris -----	“ G. A. Norris.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Richmond -----	Lt. Com. E. S. Houston -----	“ Diehl.
“ Enterprise -----	Lt. G. A. Norris -----	“ G. A. Norris.
“ Wachusett -----	“ B. S. Richards -----	“ Scott.
“ Richmond -----	Lt. Com. E. S. Houston -----	“ Diehl.
“ Essex -----	Lt. W. H. Parker -----	“ Scott.
“ Juniata -----	“ E. H. C. Leutze -----	“ Diehl.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
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North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
June 5, 1883 -----	5° 00'	134° 56' W.	7° 39' E.
Aug. 5, 1883 -----	5 25	130 50 W.	6 09 E.
Aug. 3, 1883 -----	5 28	30 19 W.	17 25 W.
May 28, 1884 -----	5 32	53 54 E.	2 52 W.
Feb. 14, 1883 -----	5 45	24 24 W.	17 53 W.
April 13, 1884 -----	5 45	81 45 E.	0 11 E.
April 16, 1884 -----	5 45	92 22 E.	0 46 W.
April 15, 1884 -----	5 48	89 36 E.	0 14 W.
April 14, 1884 -----	5 52	85 29 E.	0 02 E.
April 26, 1884 -----	5 55	106 52 E.	3 03 E.
April 16, 1884 -----	5 55	169 30 E.	7 49 E.
Aug. 5, 1883 -----	6 00	131 02 W.	5 33 E.
March 16, 1885 -----	6 02	78 45 W.	6 00 E.
April 13, 1884 -----	6 27	39 38 W.	11 30 W.
Oct. 4, 1883 -----	6 44	107 12 E.	2 59 E.
Aug. 4, 1883 -----	6 54	29 54 W.	17 03 W.
April 20, 1884 -----	7 00	168 11 E.	9 26 E.
March 29, 1885 ---	7 10	80 00 W.	4 40 E. <i>a</i>
Jan. 14, 1883 -----	7 16	79 45 W.	4 24 E.
June 12, 1883 -----	7 23	78 27 E.	1 52 E.
June 6, 1883 -----	7 28	135 37 W.	7 47 E.
April 14, 1884 -----	7 30	166 54 E.	8 55 E.
Dec. 7, 1884 -----	7 40	33 38 W.	13 32 W.

10

a = Mean of observations on 8 equidistant points.

From 5° North to 10° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex -----	Lt. W. H. Parker -----	Lt. Scott.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Richmond --	Lt. Com. E. S. Houston --	“ Diehl.
“ Enterprise--	Lt. G. A. Norris -----	“ Hubbard.
“ Trenton -----	“ Asa Walker -----	“ Diehl.
“ Trenton -----	“ Asa Walker -----	“ Diehl.
“ Trenton -----	“ Asa Walker -----	“ Diehl.
“ Trenton -----	“ Asa Walker -----	“ Diehl.
“ Trenton -----	“ Asa Walker -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Diehl.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Wachusett--	“ B. S. Richards -----	“ Scott.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Enterprise--	“ G. A. Norris -----	“ Scott.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Diehl.
“ Wachusett	“ B. S. Richards -----	“ Scott.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Juniata -----	“ E. H. C. Leutze -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Feb. 13, 1883-----	7° 48'	24° 16' W.	18° 30' W.
June 24, 1883-----	7 50	81 54 E.	1 27 E.
April 14, 1884-----	7 51	41 32 W.	10 31 W.
April 21, 1884-----	7 57	166 12 E.	9 40 E.
Sept. 4, 1884-----	8 02	107 38 E.	2 36 E.
Aug. 7, 1883-----	8 09	132 35 W.	6 20 E.
Aug. 5, 1883-----	8 36	30 03 W.	17 47 W.
April 15, 1884-----	8 46	107 46 E.	4 28 E.
April 22, 1884-----	8 58	164 40 E.	7 48 E.
April 27, 1884-----	9 00	108 53 E.	3 23 E.
April 6, 1884-----	9 11	76 18 E.	0 16 W.
March 20, 1884-----	9 22	79 54 W.	5 23 E.
May 30, 1884-----	9 32	51 33 E.	2 33 W.
Sept. 3, 1884-----	9 34	108 40 E.	2 26 E.
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From 5° North to 10° North.

[illegible]

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
May 12, 1885 -----	10° 06'	78° 23' W.	4° 34' E. ^a
Feb. 12, 1883 -----	10 11	23 55 W.	19 00 W.
Feb. 25, 1883 -----	10 15	79 18 W.	3 56 E.
Aug. 6, 1883 -----	10 20	30 35 W.	16 59 W.
March 15, 1884 --	10 20	75 31 W.	4 12 E. ^b
July 1, 1883 -----	10 23	80 33 E.	1 48 E.
March 9, 1884 -----	10 25	75 32 W.	4 07 E.
April 16, 1884 -----	10 32	46 19 W.	8 30 W.
Jan. 3, 1885 -----	10 33	61 49 W.	0 44 E. ^c
Jan. 30, 1884 -----	10 37	66 57 W.	2 44 E.
Aug. 8, 1883 -----	10 38	134 13 W.	6 05 E.
Jan. 22, 1884 -----	10 39	61 44 W.	0 47 E.
April 14, 1884 -----	10 42	110 22 E.	4 48 E.
April 23, 1884 -----	10 43	163 58 E.	7 32 E.
Aug. 17, 1883 -----	10 44	94 49 E.	1 43 E.
Dec. 8, 1884 -----	10 45	36 00 W.	14 06 W.
June 8, 1883 -----	10 47	137 30 W.	7 20 E.
March 3, 1884 -----	11 00	74 58 W.	3 58 E.
Jan. 24, 1884 -----	11 06	66 07 W.	2 54 E.
Aug. 6, 1883 -----	11 08	30 50 W.	16 23 W.
Feb. 2, 1884 -----	11 13	67 26 W.	1 32 E.
March 1, 1884 -----	11 15	74 14 W.	4 13 E.
April 23, 1884 -----	11 18	163 58 E.	7 39 E.

14

a = Mean of observations on 8 equidistant points.

b = Determined by observations on shore.

c = Mean of observations on 12 equidistant points.

From 10° North to 15° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Tennessee	Lt. S. W. Very -----	Lt. S. W. Very.
" Enterprise	" G. A. Norris	" Hubbard.
" Vandalia	" C. Belknap	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Vandalia	" C. Belknap	" C. Belknap.
" Juniata	" E. H. C. Leutze	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Swatara	" R. B. Peck	" R. B. Peck.
" Vandalia	" C. Belknap	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Essex	Lt. W. H. Parker	" Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Essex	" W. Kellogg	" Scott.
" Essex	" W. H. Parker	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Essex	" W. H. Parker	" Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Aug. 7, 1883 -----	11° 24'	31° 15' W.	16° 28' W.
Jan. 24, 1884 -----	11 25	65 48 W.	1 31 E.
Sept. 30, 1883 -----	11 28	111 09 E.	2 35 E.
April 17, 1884 -----	11 33	48 49 W.	7 27 W.
Feb. 29, 1884 -----	11 36	74 08 W.	4 49 E.
Jan. 23, 1884 -----	11 43	63 19 W.	1 02 E.
June 10, 1883 -----	11 43	74 31 E.	0 33 E.
July 10, 1883 -----	11 53	79 52 E.	0 03 W. <i>a</i>
April 28, 1884 -----	11 59	110 40 E.	2 48 E.
June 9, 1883 -----	12 00	139 40 W.	7 36 E.
Jan. 3, 1884 -----	12 00	61 11 W.	0 13 E.
Feb. 28, 1884 -----	12 01	73 13 W.	3 39 E.
Feb. 24, 1883 -----	12 06	77 15 W.	2 14 E.
Feb. 23, 1884 -----	12 07	68 57 W.	2 00 E.
April 18, 1884 -----	12 12	51 16 W.	5 17 W.
Feb. 26, 1884 -----	12 16	69 15 W.	2 39 E.
March 23, 1884 -----	12 23	80 24 W.	5 12 E.
June 2, 1884 -----	12 27	46 40 E.	3 50 W. <i>a</i>
Aug. 9, 1883 -----	12 29	136 02 W.	6 29 E. <i>b</i>
June 9, 1883 -----	12 30	140 25 W.	7 36 E.
April 20, 1884 -----	12 37	54 35 W.	3 23 W.
Dec. 9, 1884 -----	12 41	38 39 W.	14 20 W.
Aug. 16, 1883 -----	12 42	94 01 E.	2 14 E.

16

a = Mean of observations on 8 equidistant points.

b = " " " " " 16 " "

From 10° North to 15° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Galena -----	Lt. H. W. Lyon -----	Lt. Diehl.
“ Vandalia -----	“ C. Belknap -----	“ Diehl.
“ Juniata -----	“ E. H. C. Leutze -----	“ Diehl.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Vandalia -----	“ C. Belknap -----	“ Diehl.
“ Vandalia -----	“ C. Belknap -----	“ Diehl.
“ Juniata -----	“ E. H. C. Leutze -----	“ Diehl.
“ Juniata -----	“ E. H. C. Leutze -----	“ Diehl.
“ Trenton -----	“ Asa Walker -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Diehl.
“ Vandalia -----	“ C. Belknap -----	“ Diehl.
“ Vandalia -----	“ C. Belknap -----	“ Diehl.
“ Vandalia -----	“ C. Belknap -----	“ Hubbard.
“ Vandalia -----	“ C. Belknap -----	“ Diehl.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Vandalia -----	“ C. Belknap -----	“ Diehl.
“ Vandalia -----	“ C. Belknap -----	“ Diehl.
“ Richmond -----	Lt. Com. E. S. Houston -----	Lt. Com. Houston.
“ Pensacola -----	Lt. F. Hanford -----	Lt. Diehl.
“ Essex -----	“ W. H. Parker -----	“ Diehl.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Juniata -----	“ E. H. C. Leutze -----	“ Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
April 5, 1884-----	12° 44'	74° 24' E.	0° 07' W.
March 4, 1883-----	12 45	81 11 W.	3 52 E.
April 4, 1883-----	12 48	46 36 E.	5 11 W.
Feb. 27, 1884-----	12 48	71 15 W.	3 18 E.
Aug. 8, 1883-----	12 50	32 39 W.	15 56 W.
Feb. 11, 1883-----	12 50	23 32 W.	20 24 W.
April 21, 1884-----	12 53	56 20 W.	2 11 W.
June 6, 1884-----	13 00	43 16 E.	3 22 W.
March 14, 1884-----	13 10	46 29 E.	4 52 W.
April 13, 1884-----	13 14	112 13 E.	4 04 E.
July 27, 1884-----	13 15	109 54 E.	3 04 E.
June 10, 1883-----	13 17	141 55 W.	8 18 E.
July 18, 1883-----	13 18	80 40 E.	2 05 E.
April 24, 1884-----	13 19	59 41 W.	1 50 W.
Aug. 8, 1883-----	13 24	33 18 W.	14 36 W.
April 10, 1884-----	13 24	165 06 E.	8 01 E.
Aug. 10, 1883-----	13 31	137 44 W.	6 33 E.
April 6, 1883-----	13 35	49 59 E.	3 33 W.
Sept. 2, 1884-----	13 43	109 32 E.	1 27 E.
Jan. 2, 1884-----	13 58	60 59 W.	0 31 E.
Aug. 1, 1884-----	14 00	112 38 E.	2 18 E.
Dec. 21, 24, 1883-----	14 01	61 01 W.	0 23 E.
Feb. 23, 1883-----	14 08	74 26 W.	2 19 E.

From 10° North to 15° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Trenton ----	Lt. Asa Walker -----	Lt. Diehl.
“ Vandalia ----	“ C. Belknap -----	“ Hubbard.
“ Juniata ----	“ E. H. C. Leutze -----	“ Diehl.
“ Vandalia ----	“ C. Belknap -----	“ Diehl.
“ Galena ----	“ H. W. Lyon -----	“ Diehl.
“ Enterprise --	“ G. A. Norris -----	“ Hubbard.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Richmond --	Lt. Com. E. S. Houston --	“ Diehl.
“ Trenton ----	Lt. Asa Walker -----	“ Diehl.
“ Richmond --	Lt. Com. E. S. Houston --	“ Diehl.
“ Essex -----	Lt. W. H. Parker -----	“ Scott.
“ Essex -----	“ W. H. Parker -----	“ Diehl.
“ Juniata ----	“ E. H. C. Leutze -----	“ Diehl.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Galena ----	“ H. W. Lyon -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Diehl.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Juniata ----	“ E. H. C. Leutze -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Scott.
“ Vandalia ----	“ C. Belknap -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Scott.
“ Vandalia ----	“ C. Belknap -----	“ Diehl.
“ Vandalia ----	“ C. Belknap -----	“ Hubbard.

North Latitude:

[illegible]

20

a = Mean of observations on 8 equidistant points.

b = “ “ “ “ 16 “ “

From 10° North to 15° North.

[illegible]

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Dec. 12, 1884-----	15° 04'	45° 50' W.	10° 20' W.
June 11, 1883-----	15 09	144 21 W.	8 30 E. <i>a</i>
Aug. 9, 1883-----	15 12	35 32 W.	14 54 W.
Dec. 12, 1884-----	15 13	45 24 W.	10 10 W.
Aug. 12, 1883-----	15 23	139 56 W.	7 37 E.
April 12, 1884-----	15 27	113 42 E.	2 30 E.
Jan. 17, 1884-----	15 29	178 16 W.	11 45 E.
April 8, 1883-----	15 30	55 00 E.	3 09 W.
March 5, 1883-----	15 30	81 41 W.	3 26 E.
March 17, 1884-----	15 33	57 39 E.	1 18 W.
Dec. 13, 1884-----	15 34	46 36 W.	10 06 W.
Aug. 3, 1884-----	15 36	114 17 E.	2 44 E.
Aug. 10, 1883-----	15 36	37 27 W.	14 41 W.
Jan. 22, 1884-----	15 36	172 42 E.	9 32 E.
Jan. 23, 1884-----	15 40	171 25 E.	9 07 E.
June 12, 1883-----	15 48	145 23 W.	8 48 E. <i>a</i>
Feb. 22, 1883-----	15 50	72 15 W.	1 07 E.
March 24, 1884-----	15 52	80 51 W.	5 13 E.
April 7, 1884-----	16 00	62 00 W.	1 00 W.
March 28, 1883-----	16 02	41 22 E.	5 18 W.
Aug. 12, 1883-----	16 02	140 43 W.	7 51 E.
April 25, 1884-----	16 04	59 32 W.	2 38 W.
Oct. 7, 1883-----	16 10	114 09 E.	3 02 E.

From 15° North to 20° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex -----	Lt. W. Kellogg -----	Lt. Scott.
“ Essex -----	“ W. H. Parker -----	“ W. H. Parker.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Pensacola --	“ F. Hanford -----	“ Hubbard.
“ Richmond --	Lt. Com. E. S. Houston --	“ Diehl.
“ Alert -----	Lt. W. Swift -----	“ Diehl.
“ Juniata ---	“ E. H. C. Leutze -----	“ Diehl.
“ Vandalia ---	“ C. Belknap -----	“ Hubbard.
“ Trenton ---	“ Asa Walker -----	“ Diehl.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Essex -----	“ W. H. Parker -----	“ Scott.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Alert -----	“ W. Swift -----	“ Diehl.
“ Alert -----	“ W. Swift -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ W. H. Parker.
“ Vandalia ---	“ C. Belknap -----	“ Hubbard.
“ Vandalia ---	“ C. Belknap -----	“ Diehl.
“ Jamestown --	“ R. Davenport -----	“ Scott.
“ Juniata ---	“ E. H. C. Leutze -----	“ Diehl.
“ Pensacola --	“ F. Hanford -----	“ Hubbard.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Enterprise--	“ G. A. Norris -----	“ Scott.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Sept. 1, 1884-----	16° 10'	109° 39' E.	2 23 E.
Dec. 27, 1884-----	16 13	59 39 W.	2 13 W.
March 18, 1884-----	16 13	61 21 E.	1 48 W.
Aug. 11, 1883-----	16 15	40 00 W.	13 28 W.
Nov. 10, 1884-----	16 19	24 49 W.	19 47 W. <i>a</i>
Dec. 14, 1884-----	16 23	49 57 W.	9 15 W.
Jan. 28, 1884-----	16 30	160 15 E.	5 39 E.
April 4, 1884-----	16 38	72 52 E.	1 35 E.
May 17, 1884-----	16 44	64 38 W.	0 21 E.
April 11, 1884-----	16 46	114 04 E.	1 40 E.
Dec. 15, 1884-----	16 47	51 49 W.	8 11 W.
May 16, 1884-----	16 48	64 54 W.	0 30 E.
Aug. 12, 1883-----	16 50	42 42 W.	10 55 W.
Nov. 18, 1882-----	16 51	99 56 W.	7 54 E. <i>b</i>
Aug. 13, 1883-----	16 52	142 13 W.	8 08 E.
March 24, 1884-----	16 53	81 33 W.	5 28 E.
March 19, 1884-----	16 58	65 07 E.	0 26 E. <i>c</i>
April 9, 1884-----	17 00	164 17 E.	8 07 E.
April 25, 1884-----	17 00	59 31 W.	2 30 W. <i>c</i>
Nov. 13, 1882-----	17 04	100 54 W.	8 33 E.
June 8, 1884-----	17 07	40 53 E.	3 51 W.
June 13, 1883-----	17 12	147 36 W.	10 18 E.
Sept. 1, 1884-----	17 13	109 54 E.	2 54 E.

24

a = Mean of observations on 12 equidistant points.

b = Mean of 2 sets of observations on 32 points; starboard and port helm.

c = Mean of observations on 16 equidistant points.

From 15° North to 20° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex -----	Lt. W. H. Parker -----	Lt. Scott.
“ Swatara -----	“ R. B. Peck -----	“ Scott.
“ Trenton -----	“ Asa Walker -----	“ Diehl.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Kearsarge -----	“ J. D. Adams -----	“ J. D. Adams.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Alert -----	“ W. Swift -----	“ Diehl.
“ Trenton -----	“ Asa Walker -----	“ Diehl.
“ Jamestown -----	“ R. Davenport -----	“ Scott.
“ Richmond -----	Lt. Com. E. S. Houston -----	“ Diehl.
“ Essex -----	Lt. W. Kellogg -----	“ Scott.
“ Jamestown -----	“ R. Davenport -----	“ Scott.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Ranger -----	“ W. P. Ray -----	“ Hubbard.
“ Pensacola -----	“ F. Hanford -----	“ Hubbard.
“ Vandalia -----	“ C. Belknap -----	“ Diehl.
“ Trenton -----	“ Asa Walker -----	“ A. Walker.
“ Essex -----	“ W. H. Parker -----	“ Diehl.
“ Pensacola -----	“ F. Hanford -----	“ F. Hanford.
“ Ranger -----	“ W. P. Ray -----	“ Hubbard.
“ Richmond -----	Lt. Com. E. S. Houston -----	“ Diehl.
“ Essex -----	Lt. W. H. Parker -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Scott.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
March 8, 1884-----	17° 16'	40° 38' E.	4° 30' W.
April, 1884 -----	17 18	62 43 W.	1 05 W. a
April 25, 1884-----	17 22	63 24 W.	0 35 W.
Jan. 30, 1884-----	17 40	155 55 E.	3 48 E.
April, 1884 -----	17 43	64 53 W.	0 41 W. a
Aug. 13, 1883-----	17 50	45 11 W.	10 19 W.
Dec. 16, 1884-----	17 51	56 06 W.	5 07 W.
April 26, 1884-----	17 51	157 43 E.	6 59 E.
Nov. 12, 1882-----	17 56	103 15 W.	7 18 E.
Feb. 8, 1884 -----	17 58	76 48 W.	2 20 E. b
Dec. 13, 1883 -----	17 58	73 43 W.	1 49 E. b
April 11, 1884-----	18 00	114 00 E.	2 48 E.
Aug. 14, 1883-----	18 02	144 46 W.	8 49 E.
June 6, 1883-----	18 09	72 18 E.	1 43 E.
March 25, 1884-----	18 15	82 27 W.	4 55 E.
Aug. 13, 1883-----	18 15	46 12 W.	10 37 W.
March 6, 1883-----	18 17	82 57 W.	4 09 E.
April 30, 1884-----	18 20	113 26 E.	2 14 E.
April 10, 1883-----	18 23	58 10 E.	1 42 W.
Feb. 20, 1883-----	18 28	69 52 W.	0 02 E.
Dec. 17, 1884 -----	18 29	59 50 W.	1 50 W. c
Jan. 7, 1885 -----	18 33	74 43 W.	2 30 E. d
Dec. 8 1883-----	18 36	72 30 W.	2 23 E.

26

a = Mean of several observations.

b = Mean of observations on 28 equidistant points.

c = " " " " 4 " "

d = " " " " 32 " "

From 15° North to 20° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Trenton ----	Lt. Asa Walker-----	Lt. Diehl.
“ Jamestown ----	“ R. Davenport -----	“ Davenport.
“ Jamestown --	“ R. Davenport -----	“ Scott.
“ Alert -----	“ W. Switt-----	“ Diehl.
“ Jamestown ----	“ R. Davenport -----	“ Davenport.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Essex -----	“ W. H. Parker-----	“ Diehl.
“ Ranger-----	“ W. P. Ray-----	“ Hubbard.
“ Swatara -----	“ R. B. Peck -----	“ R. B. Peck.
“ Swatara -----	“ R. B. Peck -----	“ R. B. Peck.
“ Richmond --	Lt. Com. E. S. Houston--	“ Diehl.
“ Pensacola --	Lt. F. Hanford-----	“ Hubbard.
“ Juniata ----	“ E. H. C. Leutze ----	“ Diehl.
“ Vandalia ----	“ C. Belknap -----	“ Diehl.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Vandalia ----	“ C. Belknap-----	“ Hubbard
“ Trenton ----	“ Asa Walker-----	“ Diehl.
“ Juniata ----	“ E. H. C. Leutze-----	“ Diehl.
“ Vandalia ----	“ C. Belknap-----	“ Hubbard.
“ Essex -----	“ W. Kellogg -----	“ W. Kellogg.
“ Alliance -----	“ J. C. Rich -----	“ J. C. Rich.
“ Swatara-----	“ R. B. Peck -----	“ Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Feb. 13, 1883 -----	18° 38'	72° 55' W.	0° 58' E. <i>a</i>
Aug. 31, 1884 -----	18 42	111 30 E.	2 32 E.
March 27, 1883 -----	18 47	39 32 E.	6 11 W. <i>b</i>
April 8, 1884-----	18 47	164 04 E.	8 10 E.
July 21, 1883 -----	18 48	85 16 E.	0 50 E.
Jan. 8, 1883-----	18 51	66 58 W.	1 30 W.
March 13, 1884 -----	18 56	72 52 W.	0 57 E. <i>c</i>
Aug. 14, 1883-----	18 57	47 50 W.	9 18 W.
April 27, 1884-----	19 02	60 25 W.	3 46 W.
Aug. 5, 1883-----	19 03	89 58 E.	2 24 E.
March 25, 1884-----	19 06	82 53 W.	4 49 E.
Jan. 11, 1883 -----	19 12	69 18 W.	0 19 E.
June 23, 1883 -----	19 18	73 27 W.	1 51 E.
April 27, 1884-----	19 20	156 20 E.	5 59 E.
Aug. 4, 1884 -----	19 25	114 06 E.	2 20 E.
Dec. 2, 1883-----	19 25	112 31 E.	1 11 E.
June 15, 1883 -----	19 36	151 51 W.	10 18 E.
April 8, 1884 -----	19 38	163 41 E.	8 23 E.
March 22, 1884 -----	19 39	95 13 E.	6 54 E.
Dec. 18, 1883 -----	19 40	59 17 W.	3 22 W.
Sept. 22, 1883 -----	19 40	167 01 E.	8 22 E.
Oct. 19, 1883 -----	19 44	114 04 E.	1 58 E.
Sept. 10, 1883 -----	19 44	174 55 W.	10 18 E.

28

a = Mean of observations on 16 equidistant points.

b = " " " " 32 "

c = " " " " 24 "

From 15° North to 20° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Vandalia ..	Lt. C. Belknap -----	Lt. C. Belknap.
" Essex	" W. H. Parker -----	" Scott.
" Juniata	" E. H. C. Leutze -----	" E. H. C. Leutze.
" Essex	" W. H. Parker -----	" Diehl.
" Juniata	" E. H. C. Leutze -----	" Diehl.
" Vandalia	" C. Belknap -----	" Hubbard.
" Galena	" C. H. Judd -----	" C. H. Judd.
" Galena	" H. W. Lyon -----	" Diehl.
" Pensacola ..	" F. Hanford	" Diehl.
" Juniata	" E. H. C. Leutze -----	" Diehl.
" Vandalia	" C. Belknap -----	" Diehl.
" Vandalia	" C. Belknap -----	" Hubbard.
" Vandalia	" C. Belknap -----	" Hubbard.
" Essex	" W. H. Parker -----	" Diehl.
" Essex	" W. H. Parker -----	" Scott.
" Pensacola ..	" F. Hanford	" Diehl.
" Essex	" W. H. Parker -----	" Diehl.
" Essex	" W. H. Parker -----	" Diehl.
" Tennessee ..	" S. W. Very -----	" Scott.
" Vandalia	" C. Belknap -----	" Diehl.
" Pensacola ..	" F. Hanford	" Diehl.
" Enterprise ..	" G. A. Norris -----	" Scott.
" Pensacola ..	" F. Hanford	" Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Sept. 21, 1883 -----	19° 45'	168° 27' E.	8° 34' E.
Dec. 25, 1884 -----	19 46	59 33 W.	3 54 W.
Sept. 19, 1883 -----	19 48	171 02 E.	9 29 E.
Sept. 19, 1883 -----	19 48	170 20 E.	8 54 E.
Sept. 9, 1883 -----	19 48	172 48 W.	10 26 E.
Sept. 8, 1883 -----	19 49	170 11 W.	10 05 E.
Sept. 7, 1883 -----	19 49	167 25 W.	10 02 E.
Sept. 20, 1883 -----	19 49	169 33 W.	8 52 E.
July 14, 1883 -----	19 50	172 50 W.	10 48 E.
July 15, 1883 -----	19 50	174 26 W.	10 30 E.
Sept. 15, 1883 -----	19 50	176 38 E.	10 33 E.
Sept. 20, 1883 -----	19 50	169 24 E.	8 45 E.
Sept. 11, 1883 -----	19 51	177 12 W.	10 46 E.
July 13, 1883 -----	19 51	170 22 W.	10 24 E.
July 14, 1883 -----	19 51	172 03 W.	10 36 E.
Oct. 20, 1883 -----	19 52	73 36 W.	1 09 E.
Sept. 18, 1883 -----	19 53	172 28 E.	10 22 E.
July 16, 1883 -----	19 53	177 23 W.	10 18 E.
July 16, 1883 -----	19 53	177 23 W.	10 18 E. <i>a</i>
Sept. 12, 1883 -----	19 53	179 22 W.	10 58 E.
July 13, 1883 -----	19 55	169 31 W.	10 42 E.
July 12, 1883 -----	19 56	167 51 W.	10 54 E.
March 26, 1883 -----	19 56	38 57 E.	5 22 W. <i>b</i>

30

a = Mean of observations on 28 equidistant points.

b = " " " " 32 " "

From 15° North to 20° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Pensacola ..	Lt. F. Hanford	Lt. Diehl.
“ Swatara	“ R. B. Peck	“ Scott.
“ Pensacola ..	“ F. Hanford	“ Diehl.
“ Pensacola ..	“ F. Hanford	“ Diehl.
“ Pensacola ..	“ F. Hanford	“ Diehl.
“ Pensacola ..	“ F. Hanford	“ Diehl.
“ Pensacola ..	“ F. Hanford	“ Diehl.
“ Pensacola ..	“ F. Hanford	“ Diehl.
“ Essex	“ W. H. Parker	“ Hubbard.
“ Essex	“ W. H. Parker	“ Hubbard.
“ Pensacola ..	“ F. Hanford	“ Diehl.
“ Pensacola ..	“ F. Hanford	“ Diehl.
“ Pensacola ..	“ F. Hanford	“ Diehl.
“ Essex	“ W. H. Parker	“ Hubbard.
“ Essex	“ W. H. Parker	“ Hubbard.
“ Swatara	“ R. B. Peck	“ Scott.
“ Pensacola ..	“ F. Hanford	“ Diehl.
“ Essex	“ W. H. Parker	“ Hubbard.
“ Essex	“ W. H. Parker	“ W. H. Parker.
“ Pensacola ..	“ F. Hanford	“ Diehl.
“ Essex	“ W. H. Parker	“ Hubbard.
“ Essex	“ W. H. Parker	“ Hubbard.
“ Juniata	“ E. H. C. Leutze	“ E. H. C. Leutze.

North Latitude:

[illegible]

From 15° North to 20° North.

[illegible]

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Aug. 16, 1883 -----	20° 00'	150° 29' W.	9° 10' E.
July 17, 1883 -----	20 01	179 20 W.	10 24 E.
July 16, 1883 -----	20 02	176 46 W.	11 30 E.
Sept. 16, 1883 -----	20 03	174 34 E.	8 56 E. <i>a</i>
April 6, 1884 -----	20 04	65 57 W.	0 14 W.
Sept. 23, 1883 -----	20 04	164 49 E.	7 55 E.
July 10, 1883 -----	20 07	162 29 W.	9 42 E. <i>b</i>
March 7, 1884 -----	20 08	95 33 W.	7 10 E. <i>c</i>
Sept. 17, 1883 -----	20 10	173 53 E.	10 03 E.
Jan. 25, 1883 -----	20 13	70 51 W.	0 55 E.
July 19, 1883 -----	20 15	178 38 E.	10 18 E.
April 28, 1884 -----	20 15	61 04 W.	3 43 W.
March 26, 1884 -----	20 17	83 32 W.	5 24 E.
Sept. 5, 1883 -----	20 17	163 20 W.	9 21 E.
Sept. 24, 1883 -----	20 18	163 25 E.	7 50 E.
July 20, 1883 -----	20 18	177 24 E.	11 30 E.
June 9, 1884 -----	20 19	38 18 E.	4 14 W.
Dec. 2, 1883 -----	20 19	113 09 E.	1 28 E.
April 11, 1884 -----	20 20	72 20 W.	0 26 E. <i>d</i>
Aug. 15, 1883 -----	20 21	50 45 W.	8 11 W.
March 23, 1884 -----	20 21	93 47 W.	7 05 E.
July 20, 1883 -----	20 22	176 32 E.	11 34 E.
June 16, 1883 -----	20 25	153 40 W.	11 12 E.

34

a = Mean of observations on 16 equidistant points.

b = " " " " 28 " "

c = " " " " 4 " "

d = " " " " 32 " "

From 20° North to 25° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Pensacola ..	Lt. F. Hanford	Lt. Hubbard.
“ Essex	“ W. H. Parker	“ Hubbard.
“ Essex	“ W. H. Parker	“ Hubbard.
“ Pensacola ..	“ F. Hanford	“ F. Hanford.
“ Portsmouth ..	“ H. Winslow	“ Scott.
“ Pensacola ..	“ F. Hanford	“ Diehl.
“ Essex	“ W. H. Parker	“ W. H. Parker.
“ Tennessee ..	“ S. W. Very	“ S. W. Very.
“ Pensacola ..	“ F. Hanford	“ Diehl.
“ Vandalia	“ C. Belknap	“ Diehl.
“ Essex	“ W. H. Parker	“ Hubbard.
“ Pensacola ..	“ F. Hanford	“ Diehl.
“ Vandalia	“ C. Belknap	“ Diehl.
“ Pensacola ..	“ F. Hanford	“ Diehl.
“ Pensacola ..	“ F. Hanford	“ Diehl.
“ Essex	“ W. H. Parker	“ Hubbard.
“ Richmond ..	Lt. Com. E. S. Houston ..	“ Diehl.
“ Pensacola ..	Lt. F. Hanford	“ Diehl.
“ Alliance	“ J. C. Rich	“ J. C. Rich.
“ Galena	“ H. W. Lyon	“ Diehl.
“ Tennessee ..	“ S. W. Very	“ Scott.
“ Essex	“ W. H. Parker	“ Hubbard.
“ Essex	“ W. H. Parker	“ Hubbard.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
July 9, 1883 -----	20° 25'	161° 22' W.	9 48 E. <i>a</i>
Sept. 5, 1883 -----	20 28	162 33 W.	9 34 E.
Feb. 1, 1884 -----	20 29	84 43 W.	4 47 E.
Sept. 25, 1883 -----	20 32	161 24 E.	6 38 E.
March 7, 1883 -----	20 34	84 38 W.	4 09 E.
July 21, 1883 -----	20 34	174 53 E.	11 28 E.
Jan. 4, 1884 -----	20 35	157 45 W.	9 57 E. <i>b</i>
Aug. 4, 1884 -----	20 38	114 00 E.	1 33 E.
March 26, 1884 -----	20 40	84 03 W.	5 46 E.
April 29, 1884 -----	20 42	61 51 W.	2 43 W.
May 21, 1883 -----	20 45	69 36 E.	0 20 E.
Feb. 1, 1884 -----	20 47	84 58 W.	5 13 E.
March 23, 1884 -----	20 49	92 47 W.	5 49 E.
July 22, 1883 -----	20 50	172 16 E.	10 10 E.
Sept. 26, 1883 -----	20 50	159 48 E.	5 46 E.
Oct. 20, 1883 -----	20 51	74 10 W.	1 07 E.
Aug. 17, 1883 -----	20 52	153 14 W.	9 49 E.
Sept. 4, 1883 -----	20 54	160 36 W.	9 32 E.
Jan. 30, 1883 -----	20 54	71 29 W.	0 10 W.
July 22, 1883 -----	20 56	171 15 E.	9 45 E.
March 7, 1884 -----	21 00	38 14 E.	2 42 W.
Sept. 3, 1883 -----	21 02	159 03 W.	9 48 E.
June 17, 1883 -----	21 05	155 28 W.	11 20 E.

36

a = Mean of observations on 28 equidistant points.

b = " " " " 16 " "

From 20° North to 25° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex -----	Lt. W. H. Parker -----	Lt. W. H. Parker.
" Pensacola --	" F. Hanford -----	" Diehl.
" Tennessee --	" S. W. Very -----	" Scott.
" Pensacola --	" F. Hanford -----	" Diehl.
" Vandalia --	" C. Belknap -----	" Hubbard.
" Essex -----	" W. H. Parker -----	" Hubbard.
" Alert -----	" W. Swift -----	" Hubbard.
" Essex -----	" W. H. Parker -----	" Scott.
" Vandalia --	" C. Belknap -----	" Diehl.
" Pensacola --	" F. Hanford -----	" Diehl.
" Juniata --	" E. H. C. Leutze -----	" Diehl.
" Tennessee --	" S. W. Very -----	" Scott.
" Tennessee --	" S. W. Very -----	" Scott.
" Essex -----	" W. H. Parker -----	" Hubbard.
" Pensacola --	" F. Hanford -----	" Diehl.
" Swatara --	" R. B. Peck -----	" Scott.
" Pensacola --	" F. Hanford -----	" Hubbard.
" Pensacola --	" F. Hanford -----	" Diehl.
" Vandalia --	" C. Belknap -----	" Diehl.
" Essex -----	" W. H. Parker -----	" Hubbard.
" Trenton --	" Asa Walker -----	" Diehl.
" Pensacola --	" F. Hanford -----	" Diehl.
" Essex -----	" W. H. Parker -----	" Hubbard.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Aug. 30, 1884 -----	21° 06'	113° 28' E.	0° 49' E.
Aug. 19, 1883 -----	21 10	157 54 W.	9 09 E. <i>a</i>
Aug. 18, 1883 -----	21 13	155 27 W.	9 24 E.
Sept. 27, 1883 -----	21 13	158 25 E.	5 37 E.
June 17, 1883 -----	21 15	156 13 W.	10 42 E.
July 23, 1883 -----	21 18	169 25 E.	9 34 E.
March 7, 1884 -----	21 22	57 33 W.	6 13 W.
April 7, 1884 -----	21 25	163 19 E.	8 07 E.
April 7, 1884 -----	21 28	66 39 W.	1 04 W.
Feb. 2, 1884 -----	21 32	85 27 W.	4 58 E.
April 10, 1884 -----	21 32	76 30 W.	0 31 E.
Dec. 1, 1883 -----	21 34	114 03 E.	0 46 E.
Dec. 17, 1883 -----	21 36	59 21 W.	5 33 W.
Sept. 28, 1883 -----	21 39	156 42 E.	4 45 E.
July 24, 1883 -----	21 45	167 44 E.	8 55 E.
May 23, 1884 -----	21 49	66 13 W.	0 45 W.
July 25, 1883 -----	21 55	166 00 E.	8 46 E.
March 24, 1884 -----	21 56	90 09 W.	5 42 E.
April 30, 1884 -----	22 00	62 24 W.	3 08 W.
Aug. 16, 1883 -----	22 00	54 43 W.	8 06 W.
Feb. 2, 1884 -----	22 04	85 47 W.	5 21 E.
March 27, 1884 -----	22 05	85 07 W.	4 47 E.
April 7, 1884 -----	22 06	163 09 E.	7 40 E.

From 20° North to 25° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex -----	Lt. W. H. Parker -----	Lt. Scott.
“ Pensacola -----	“ F. Hanford -----	“ F. Hanford.
“ Pensacola -----	“ F. Hanford -----	“ Hubbard.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Portsmouth -----	“ H. Winslow -----	“ Scott.
“ Essex -----	“ W. H. Parker -----	“ Diehl.
“ Portsmouth -----	“ H. Winslow -----	“ Scott.
“ Tennessee -----	“ S. W. Very -----	“ Scott.
“ Yantic -----	“ C.W. Ruschenberger -----	“ Scott.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Vandalia -----	“ C. Belknap -----	“ Diehl.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Jamestown -----	“ R. Davenport -----	“ Scott.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Tennessee -----	“ S. W. Very -----	“ Scott.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Tennessee -----	“ S. W. Very -----	“ Scott.
“ Vandalia -----	“ C. Belknap -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Sept. 25, 1881-----	22° 10'	38° 08' W.	17° 44' W.
March 25, 1883-----	22 12	37 32 E.	4 09 W.
Sept. 25, 1881-----	22 13	38 45 W.	17 20 W.
Sept. 24, 1881-----	22 14	37 00 W.	18 22 W.
Sept. 26, 1881-----	22 14	39 41 W.	16 00 W.
June 11, 1884-----	22 15	37 15 E.	3 58 W.
Sept. 26, 1881-----	22 17	40 02 W.	17 40 W.
Sept. 27, 1881-----	22 17	40 51 W.	15 47 W.
Sept. 27, 1881-----	22 20	41 07 W.	16 16 W.
Sept. 28, 1881-----	22 20	41 52 W.	15 36 W.
Sept. 29, 1881-----	22 20	42 37 W.	15 23 W.
July 26, 1883-----	22 20	164 51 E.	7 44 E.
March 25, 1884-----	22 22	88 30 W.	5 06 E.
Sept. 23, 1881-----	22 22	34 13 W.	19 30 W.
Sept. 29, 1881-----	22 25	43 14 W.	15 06 W.
Sept. 30, 1881-----	22 25	44 13 W.	14 08 W.
Oct. 1, 1881-----	22 30	45 52 W.	13 54 W.
Sept. 23, 1881-----	22 30	34 57 W.	21 24 W.
March 25, 1884-----	22 30	87 28 W.	4 17 E.
March 6, 1884-----	22 30	93 54 W.	6 53 E.
Oct. 2, 1881-----	22 30	48 24 W.	12 06 W.
Sept. 30, 1881-----	22 34	44 49 W.	13 55 W.
Feb. 4, 1883-----	22 35	84 50 W.	3 28 E. <i>a</i>

40

a = Mean of observations on 32 equidistant points.

From 20° North to 25° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Trenton ----	Lt. Com. T. A. Lyons --	Lt. Com. Lyons.
“ Juniata ----	Lt. E. H. C. Leutze ----	Lt. Diehl.
“ Trenton ----	Lt. Com. T. A. Lyons --	Lt. Com. Lyons.
“ Trenton ----	“ T. A. Lyons --	“ Lyons.
“ Trenton ----	“ T. A. Lyons --	“ Lyons.
“ Richmond --	“ E. S. Houston --	Lt. Diehl.
“ Trenton ----	“ T. A. Lyons --	Lt. Com. Lyons.
“ Trenton ----	“ T. A. Lyons --	“ Lyons.
“ Trenton ----	“ T. A. Lyons --	“ Lyons.
“ Trenton ----	“ T. A. Lyons --	“ Lyons.
“ Trenton ----	“ T. A. Lyons --	“ Lyons.
“ Essex -----	Lt. W. H. Parker -----	Lt. Hubbard.
“ Tennessee --	“ S. W. Very -----	“ Scott.
“ Trenton ----	Lt. Com. T. A. Lyons --	Lt. Com. Lyons.
“ Trenton ----	“ T. A. Lyons --	“ Lyons.
“ Trenton ----	“ T. A. Lyons --	“ Lyons.
“ Trenton ----	“ T. A. Lyons --	“ Lyons.
“ Trenton ----	“ T. A. Lyons --	“ Lyons.
“ Tennessee --	Lt. S. W. Very -----	Lt. Scott.
“ Tennessee --	“ S. W. Very -----	“ Scott.
“ Trenton ----	Lt. Com. T. A. Lyons --	Lt. Com. Lyons.
“ Trenton ----	“ T. A. Lyons --	“ Lyons.
“ Alliance ----	Lt. C. P. Perkins -----	Lt. C. P. Perkins.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Sept. 29, 1883-----	22° 36'	154° 10' E.	3° 42' E.
Oct. 4, 1881-----	22 36	53 33 W.	8 30 W.
Oct. 4, 1881-----	22 37	54 15 W.	8 11 W.
March 8, 1883-----	22 37	84 53 W.	5 13 E.
June 16, 1883-----	22 37	69 10 W.	1 18 W.
Oct. 2, 1881-----	22 37	49 12 W.	11 45 W.
Oct. 3, 1881-----	22 37	51 00 W.	10 25 W.
May 11, 1884-----	22 38	116 48 E.	0 17 E. <i>a</i>
Oct. 3, 1881-----	22 38	51 56 W.	9 35 W.
Nov. 10, 1882-----	22 40	110 20 W.	5 32 E.
July 26, 1883-----	22 40	164 25 E.	7 43 E. <i>b</i>
Oct. 5, 1881-----	22 42	55 10 W.	7 33 W.
April 7, 1884-----	22 42	67 10 W.	1 53 W.
March 26, 1884-----	22 47	84 14 W.	3 12 E.
Aug. 17, 1883-----	22 50	56 38 W.	7 07 W.
April 6, 1884-----	22 58	78 55 W.	3 11 E.
Oct. 5, 1881-----	23 00	55 36 W.	8 35 W.
Sept. 22, 1881-----	23 00	32 20 W.	19 00 W.
April, 1884-----	23 02	81 43 W.	2 34 E. <i>c</i>
Aug. 6, 1884-----	23 03	44 14 W.	12 34 W.
March 27, 1884-----	23 05	84 34 W.	3 56 E.
Dec. 16, 1884-----	23 07	113 14 E.	0 40 E. <i>a</i>
Oct. 6, 1881-----	23 13	56 10 W.	8 12 W.

42

a = Mean of observations on 16 equidistant points.

b = " " " " 12 " "

c = " " " " 4 " "

From 20° North to 25° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Pensacola --	Lt. F. Hanford -----	Lt. Com. Lyons.
“ Trenton ----	Lt. Com. T. A. Lyons --	“ Lyons.
“ Trenton ----	“ T. A. Lyons --	“ Lyons.
“ Vandalia ----	Lt. C. Belknap -----	Lt. Hubbard.
“ Vandalia ----	“ C. Belknap -----	“ Hubbard.
“ Trenton ----	Lt. Com. T. A. Lyons --	Lt. Com. Lyons.
“ Trenton ----	“ T. A. Lyons --	“ Lyons.
“ Trenton ----	Lt. Asa Walker -----	Lt. A. Walker.
“ Trenton ----	Lt. Com. T. A. Lyons --	Lt. Com. Lyons.
“ Ranger ----	Lt. W. P. Ray -----	Lt. Hubbard.
“ Essex ----	“ W. H. Parker ----	“ W. H. Parker.
“ Trenton ----	Lt. Com. T. A. Lyons --	Lt. Com. Lyons.
“ Portsmouth	Lt. H. Winslow -----	Lt. Scott.
“ Tennessee --	“ S. W. Very -----	“ Scott.
“ Galena ----	“ H. W. Lyon -----	“ Diehl.
“ Vandalia ----	“ C. Belknap -----	“ Diehl.
“ Trenton ----	Lt. Com. T. A. Lyons --	Lt. Com. Lyons.
“ Trenton ----	“ T. A. Lyons --	“ Lyons.
“ Vandalia --	Lt. C. Belknap -----	“ Diehl
“ Richmond --	Lt. Com. E. S. Houston --	“ Diehl.
“ Vandalia --	“ C. Belknap -----	“ Diehl.
“ Alert -----	“ W. Swift -----	“ Scott.
“ Trenton ----	Lt. Com. T. A. Lyons --	Lt. Com. Lyons.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
July 27, 1883 -----	23° 14'	163° 11' E.	6° 28' E.
Feb. 3, 1884 -----	23 16	86 29 W.	5 04 E.
Aug. 17, 1883 -----	23 18	57 42 W.	6 07 W.
March 24, 1883 -----	23 18	37 00 E.	4 49 W.
May 20, 1883 -----	23 19	67 21 E.	0 47 E.
March 6, 1884 -----	23 19	93 17 W.	6 53 E.
April 5, 1884 -----	23 20	79 25 W.	2 45 E.
May 6, 1884 -----	23 21	37 02 E.	4 19 W. <i>a</i>
March 6, 1884 -----	23 23	93 10 W.	6 41 E.
April 15, 1884 -----	23 23	81 08 W.	4 10 E.
April 12, 1884 -----	23 31	80 51 W.	4 24 E.
Aug. 10, 1881 -----	23 33	53 13 W.	9 11 W.
May 25, 1884 -----	23 33	66 59 W.	1 15 W.
Aug. 5, 1884 -----	23 38	42 32 W.	14 35 W.
Oct. 6, 1881 -----	23 43	56 51 W.	9 08 W.
Sept. 21, 1881 -----	23 47	28 48 W.	20 30 W.
March 28, 1884 -----	23 48	82 58 W.	3 19 E.
April 4, 1884 -----	23 52	80 30 W.	3 28 E.
Oct. 18, 1883 -----	23 52	59 12 W.	5 59 W.
April 4, 1884 -----	23 55	80 47 W.	2 10 E.
April 13, 1884 -----	23 56	80 28 W.	2 56 E.
Aug. 11, 1884 -----	23 57	55 40 W.	7 39 W. <i>b</i>
Feb. 3, 1884 -----	23 58	86 55 W.	5 30 E.

44

a = Mean of observations on 16 equidistant points.

b = " " " " 8 " "

From 20° North to 25° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex -----	Lt. W. H. Parker -----	Lt. J. Hubbard.
“ Tennessee -----	“ S. W. Very -----	“ Scott.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Juniata -----	“ E. H. C. Leutze -----	“ Diehl.
“ Juniata -----	“ E. H. C. Leutze -----	“ Diehl.
“ Tennessee -----	“ S. W. Very -----	“ Scott.
“ Vandalia -----	“ C. Belknap -----	“ Diehl.
“ Trenton -----	“ Asa Walker -----	“ A. Walker.
“ Tennessee -----	“ S. W. Very -----	“ Scott.
“ Vandalia -----	“ C. Belknap -----	“ Diehl.
“ Swatara -----	“ R. B. Peck -----	“ Scott.
“ Richmond -----	Lt. Com. E. S. Houston -----	“ Diehl.
“ Jamestown -----	Lt. R. Davenport -----	“ Scott.
“ Richmond -----	Lt. Com. E. S. Houston -----	Lt. Diehl.
“ Trenton -----	“ T. A. Lyons -----	Lt. Com. Lyons.
“ Trenton -----	“ T. A. Lyons -----	“ Lyons.
“ Vandalia -----	Lt. C. Belknap -----	Lt. Diehl.
“ Vandalia -----	“ C. Belknap -----	“ Diehl.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Vandalia -----	“ C. Belknap -----	“ Diehl.
“ Vandalia -----	“ C. Belknap -----	“ Diehl.
“ Richmond -----	Lt. Com. E. S. Houston -----	Lt. Com. Houston.
“ Tennessee -----	Lt. S. W. Very -----	“ Scott.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Oct. 19, 1883 -----	23° 58'	74° 22' W.	1° 04' E.
April 6, 1884 -----	24 00	162 38 E.	6 39 E.
May 25, 1884 -----	24 00	67 03 W.	1 14 W.
Nov. 9, 1882 -----	24 01	111 54 W.	8 40 E.
Aug. 3, 1884 -----	24 13	40 23 W.	16 07 W. <i>a</i>
Aug. 2, 1884 -----	24 16	38 38 W.	17 44 W.
Aug. 12, 1884 -----	24 18	57 43 W.	6 31 W.
Sept. 20, 1881 -----	24 19	27 15 W.	20 30 W.
Aug. 1, 1884 -----	24 21	36 20 W.	18 23 W.
Sept. 30, 1883 -----	24 24	151 53 E.	1 42 E.
May 1, 1884 -----	24 25	62 58 W.	4 06 W.
April 1, 1884 -----	24 25	72 17 W.	1 20 W.
May 10, 1884 -----	24 25	81 46 W.	2 49 E. <i>a</i>
May 10, 1884 -----	24 27	81 27 W.	1 58 E.
Sept. 30, 1883 -----	24 27	151 50 E.	1 55 E.
April 4, 1884 -----	24 27	81 48 W.	3 00 E.
Dec. 16, 1883 -----	24 30	60 04 W.	5 50 W.
March 6, 1884 -----	24 31	36 13 E.	5 55 W.
July 31, 1883 -----	24 31	159 11 E.	5 00 E.
June 15, 1883 -----	24 32	66 51 W.	3 42 W.
April 17, 1883 -----	24 37	57 35 E.	0 44 E.
April 6, 1884 -----	24 45	162 14 E.	5 39 E.
Dec. 16, 1883 -----	24 47	60 06 W.	7 06 W.

From 20° North to 25° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Swatara ----	Lt. R. B. Peck -----	Lt. Scott.
“ Essex -----	“ W. H. Parker -----	“ Diehl.
“ Jamestown --	“ R. Davenport -----	“ Scott.
“ Ranger -----	“ W. P. Ray -----	“ Hubbard.
“ Richmond --	Lt. Com. E. S. Houston	Lt. Com. Houston.
“ Richmond --	“ E. S. Houston	“ Diehl.
“ Richmond --	“ E. S. Houston	“ Diehl.
“ Trenton ----	“ T. A. Lyons --	Lt. Com. Lyons.
“ Richmond --	“ E. S. Houston	Lt. Diehl.
“ Pensacola --	Lt. F. Hanford -----	“ Diehl.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Yantic -----	“ C.W. Ruschenberger	“ Scott.
“ Swatara ----	“ R. B. Peck -----	“ R. B. Peck.
“ Tennessee --	“ S. W. Very -----	“ Scott.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Vandalia --	“ C. Belknap -----	“ Diehl.
“ Vandalia --	“ C. Belknap -----	“ Diehl.
“ Trenton ----	“ Asa Walker -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Vandalia --	“ C. Belknap -----	“ Diehl.
“ Juniata ----	“ E. H. C. Leutze -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Diehl.
“ Vandalia --	“ C. Belknap -----	“ Diehl.

North Latitude:

[illegible]

From 20° North to 25° North.

[illegible]

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
May 14, 1883 -----	25° 00'	60° 49' E.	0° 14' W.
March 23, 1883 -----	25 00	35 50 E.	5 50 W.
June 25, 1883 -----	25 03	73 47 W.	1 16 W.
May 12, 1883 -----	25 03	59 00 E.	1 22 E.
April 5, 1883 -----	25 11	83 41 W.	3 55 E.
March 13, 1883 -----	25 17	85 41 W.	4 04 E.
May 11, 1883 -----	25 28	57 08 E.	0 25 W.
March 4, 1884 -----	25 30	87 28 W.	5 01 E.
Dec. 16, 1883 -----	25 30	60 36 W.	7 17 W.
April 5, 1883 -----	25 34	84 10 W.	3 18 E.
July 17, 1884 -----	25 39	120 55 E.	1 07 W.
March 12, 1884 -----	25 46	77 02 W.	1 12 W.
Aug. 14, 1884 -----	25 49	61 16 W.	4 56 W.
March 14, 1884 -----	26 00	121 15 E.	3 42 W.
May 23, 1884 -----	26 05	79 56 W.	1 43 E.
Oct. 1, 1883 -----	26 10	149 43 E.	0 48 E.
June 13, 1884 -----	26 11	35 02 E.	4 14 W.
April 10, 1884 -----	26 14	69 47 W.	1 33 W.
April 4, 1883 -----	26 15	86 44 W.	5 13 E.
May 11, 1884 -----	26 15	79 46 W.	2 58 E.
Feb. 4, 1884 -----	26 24	87 47 W.	4 48 E.
May 27, 1884 -----	26 27	67 20 W.	3 16 W.
Sept. 18, 1881 -----	26 30	23 37 W.	18 40 W.

From 25° North to 30° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Juniata ----	Lt. E. H. C. Leutze----	Lt. Diehl.
“ Juniata ----	“ E. H. C. Leutze-----	“ Diehl.
“ Vandalia ----	“ C. Belknap-----	“ Hubbard.
“ Juniata ----	“ E. H. C. Leutze-----	“ Diehl.
“ Yantic ----	“ E. S. Prime-----	“ Scott.
“ Vandalia ----	“ C. Belknap -----	“ Hubbard.
“ Juniata ----	“ E. H. C. Leutze-----	“ Diehl.
“ Tennessee --	“ S. W. Very -----	“ Scott.
“ Vandalia ----	“ C. Belknap -----	“ Diehl.
“ Vandalia ----	“ C. Belknap-----	“ Hubbard.
“ Essex -----	“ W. H. Parker-----	“ Scott.
“ Yantic ----	“ C. W. Ruschenberger	“ Scott.
“ Richmond --	Lt. Com. E. S. Houston--	“ Diehl.
“ Essex -----	Lt. W. H. Parker-----	“ Diehl.
“ Vandalia ----	“ C. Belknap-----	“ Diehl.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Richmond --	Lt. Com. E. S. Houston	“ Diehl.
“ Portsmouth	Lt. H. Winslow -----	“ Scott.
“ Yantic ----	“ E. S. Prime-----	“ Scott.
“ Swatara ----	“ R. B. Peck -----	“ Scott.
“ Tennessee --	“ S. W. Very -----	“ Scott.
“ Jamestown --	“ R. G. Davenport----	“ Scott.
“ Trenton ----	Lt. Com. T. A. Lyons --	Lt. Com. Lyons.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
April 4, 1883 -----	26° 30'	86° 15' W.	4° 50' E.
March 22, 1883 -----	26 32	34 36 W.	6 18 W.
April 4, 1883 -----	26 37	86 25 W.	3 31 E.
Aug. 21, 1883 -----	26 42	64 43 W.	6 04 W.
Aug. 15, 1884 -----	26 44	62 47 W.	5 35 W.
May 6, 1883 -----	26 48	52 55 E.	0 20 E.
July 28, 1884 -----	26 52	26 00 W.	20 19 W. <i>a</i>
May 10, 1883 -----	26 56	56 26 E.	0 19 W. <i>a</i>
April 12, 1883 -----	26 58	79 47 W.	2 01 E.
Dec. 31, 1883 -----	27 00	120 26 E.	2 22 E.
Dec. 15, 1883 -----	27 00	62 20 W.	5 37 W.
April 5, 1884 -----	27 00	161 11 E.	5 06 E.
Sept. 18, 1881 -----	27 00	23 00 W.	19 20 W.
April 11, 1884 -----	27 00	69 36 W.	2 39 W.
Feb. 5, 1884 -----	27 15	88 23 W.	5 15 E.
Aug. 21, 1883 -----	27 16	65 10 W.	6 33 W.
March 19, 1884 -----	27 20	79 25 W.	0 20 E.
April 8, 1883 -----	27 21	79 43 W.	1 36 E.
May 28, 1884 -----	27 27	67 31 W.	3 44 W.
March 5, 1884 -----	27 32	57 47 W.	9 58 W.
May 23, 1884 -----	27 36	79 42 W.	2 15 E.
Nov. 10, 1883 -----	27 38	123 20 E.	2 08 W.
Oct. 2, 1883 -----	27 44	148 05 E.	0 15 W.

From 25° North to 30° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Yantic -----	Lt. E. S. Prime-----	Lt. Scott.
“ Juniata -----	“ E. H. C. Leutze-----	“ Diehl.
“ Vandalia -----	“ C. Belknap-----	“ Hubbard.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Richmond --	Lt. Com. E. S. Houston	“ Diehl.
“ Juniata -----	Lt. E. H. C. Leutze-----	“ Diehl.
“ Richmond --	Lt. Com. E. S. Houston	Lt. Com. Houston.
“ Juniata -----	Lt. E. H. C. Leutze -----	Lt. E. H. C. Leutze.
“ Yantic -----	“ E. S. Prime-----	“ Scott.
“ Juniata -----	“ E. H. C. Leutze-----	“ Diehl.
“ Vandalia -----	“ C. Belknap-----	“ Diehl.
“ Essex -----	“ W. H. Parker-----	“ Diehl.
“ Trenton -----	Lt. Com. T. A. Lyons --	Lt. Com. Lyons.
“ Portsmouth	Lt. H. Winslow -----	Lt. Scott.
“ Tennessee --	“ S. W. Very -----	“ Scott.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Yantic -----	“ C.W. Ruschenberger	“ Scott.
“ Vandalia -----	“ C. Belknap-----	“ Hubbard.
“ Jamestown --	“ R. G. Davenport-----	“ Scott.
“ Portsmouth	“ H. Winslow -----	“ Scott.
“ Vandalia -----	“ C. Belknap-----	“ Diehl.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Pensacola --	“ F. Hanford -----	“ Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Aug. 22, 1883 -----	27° 45'	66° 05' W.	5° 08' W.
April 12, 1884 -----	27 50	70 05 W.	1 58 W.
Aug. 16, 1884 -----	27 55	64 26 W.	5 23 W.
March 4, 1884 -----	28 00	89 37 W.	5 52 E.
April 12, 1883 -----	28 08	79 44 W.	1 57 E.
Nov. 9, 1883 -----	28 12	122 54 E.	2 46 W.
May 11, 1884 -----	28 18	79 48 W.	1 29 E.
March 11, 1884 -----	28 21	76 55 W.	1 16 W.
Aug. 23, 1883 -----	28 30	67 27 W.	4 36 W.
Oct. 9, 1881 -----	28 33	64 35 W.	8 39 W.
June 14, 1884 -----	28 46	32 58 E.	4 19 W. <i>a</i>
May 29, 1884 -----	28 53	67 50 W.	4 41 W.
Sept. 17, 1881 -----	28 55	21 07 W.	18 40 W.
Aug. 17, 1884 -----	28 56	65 54 W.	5 03 W.
July 15, 1884 -----	29 00	123 38 E.	0 42 W.
Oct. 3, 1883 -----	29 01	146 54 E.	1 20 W.
Feb. 6, 1884 -----	29 11	89 16 W.	5 15 E. <i>b</i>
July 14, 1884 -----	29 19	125 27 E.	1 34 W.
Aug. 6, 1883 -----	29 30	150 00 E.	2 42 E.
June 13, 1883 -----	29 34	64 55 W.	4 47 W.
Oct. 14, 1883 -----	29 50	65 24 W.	5 00 W.
Dec. 22, 1884 -----	29 54	123 11 E.	2 51 W. <i>c</i>
Aug. 24, 1883 -----	29 55	68 42 W.	5 51 W.
May 2, 1884 -----	29 57	144 30 E.	0 59 W.

54

a = Mean of observations on 8 equidistant points.

b = Mean of 6 observations on different points while at anchor.

c = Mean of observations on 16 equidistant points.

From 25° North to 30° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Galena -----	Lt. H. W. Lyon-----	Lt. Diehl.
“ Portsmouth	“ H. Winslow -----	“ Scott.
“ Richmond --	Lt. Com. E. S. Houston --	“ Diehl.
“ Tennessee --	Lt. S. W. Very -----	“ Scott.
“ Yantic -----	“ E. S. Prime-----	“ Scott.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Tennessee --	“ S. W. Very -----	“ Scott.
“ Yantic -----	“ C.W. Ruschenberger	“ Scott.
“ Galena -----	“ H. W. Lyon-----	“ Diehl.
“ Trenton ----	Lt. Com. T. A. Lyons --	Lt. Com. Lyons.
“ Richmond --	Lt. Com. E. S. Houston	Lt. Com. Houston.
“ Jamestown --	Lt. R. G. Davenport----	Lt. Scott
“ Trenton ----	Lt. Com. T. A. Lyons --	Lt. Com. Lyons.
“ Richmond --	“ E. S. Houston	Lt. Diehl.
“ Essex -----	Lt. W. H. Parker-----	“ Scott.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Tennessee --	“ S. W. Very -----	“ Scott.
“ Essex -----	“ W. H. Parker-----	“ Scott.
“ Essex -----	“ W. H. Parker-----	“ Hubbard.
“ Vandalia ----	“ C. Belknap -----	“ Hubbard.
“ Jamestown --	“ R. G. Davenport----	“ Scott.
“ Juniata ----	“ E. H. C. Leutze ----	“ E. H. C. Leutze.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Essex -----	“ W. H. Parker-----	“ Scott.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
March 12, 1883 ---	30° 08'	88° 01' W.	5° 17' E. <i>a</i>
Aug. 6, 1883 -----	30 08	149 41 E.	0 54 E. <i>b</i>
March 31, 1884 -----	30 08	151 53 E.	0 06 E.
Oct. 4, 1883-----	30 12	145 25 E.	1 27 W.
Nov. 7, 1883 -----	30 16	126 30 E.	3 37 W.
Aug. 24, 1883 -----	30 23	69 11 W.	5 10 W.
Aug. 18, 1884 -----	30 24	67 25 W.	4 54 W.
Oct. 16, 1883 -----	30 26	70 59 W.	2 22 W.
May 24, 1884 -----	30 32	79 47 W.	0 13 W.
Dec. 13, 1883 -----	30 36	66 37 W.	5 39 W.
May 30, 1884 -----	30 39	68 09 W.	5 10 W.
June 5, 1884 -----	30 41	126 24 E.	3 34 W. <i>c</i>
March 30, 1884-----	30 41	149 22 E.	0 12 W.
April 14, 1884-----	30 41	71 55 W.	2 31 W.
Aug. 25, 1883 -----	30 43	69 32 W.	4 34 W.
June 6, 1884 -----	30 47	123 53 E.	3 09 W.
July 13, 1884 -----	30 52	127 09 E.	1 46 W.
Oct. 15, 1883 -----	30 54	66 03 W.	3 45 W.
Oct. 10, 1881 -----	30 58	68 10 W.	9 13 W.
May 3, 1884-----	31 00	143 30 E.	0 35 E.
Aug. 25, 1883 -----	31 00	69 22 W.	5 06 W.
Aug. 7, 1883 -----	31 02	149 16 E.	0 15 E. <i>b</i>
Dec. 20, 1884-----	31 03	63 04 W.	8 39 W.

56

a = Mean of observations on 32 equidistant points.

b = " " " " 24 " "

c = " " " " 28 " "

From 30° North to 35° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Yantic -----	Lt. E. S. Prime -----	Lt. E. S. Prime.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Essex -----	“ W. H. Parker -----	“ Diehl.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Richmond --	Lt. Com. E. S. Houston ---	“ Diehl.
“ Swatara -----	Lt. R. B. Peck -----	“ Scott.
“ Vandalia -----	“ C. Belknap -----	“ Diehl.
“ Vandalia -----	“ C. Belknap -----	“ Diehl.
“ Jamestown --	“ R. G. Davenport ----	“ Scott.
“ Juniata -----	“ E. H. C. Leutze -----	“ E. H. C. Leutze.
“ Essex -----	“ W. H. Parker -----	“ Diehl.
“ Portsmouth --	“ H. Winslow -----	“ Scott.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Juniata -----	“ E. H. C. Leutze -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Scott.
“ Jamestown --	“ R. G. Davenport ----	“ Scott.
“ Trenton -----	Lt. Com. T. A. Lyons --	Lt. Com. Lyons.
“ Essex -----	Lt. W. H. Parker -----	Lt. Scott.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Swatara -----	“ R. B. Peck -----	“ Scott.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
June 3, 1884 -----	31° 04'	128° 31' E.	4° 37' W.
Nov. 6, 1883 -----	31 08	128 08 E.	4 02 W.
March 29, 1884 ----	31 14	147 51 E.	0 59 W.
June 12, 1883 -----	31 18	65 42 W.	7 17 W.
Nov. 6, 1882 -----	31 21	118 40 W.	12 34 E.
May 12, 1884 -----	31 24	79 12 W.	1 03 E.
Oct. 16, 1883 -----	31 24	70 32 W.	3 12 W.
April 21, 1884 -----	31 28	29 41 E.	7 27 W.
May 11, 1881 ----	31 34	132 14 E.	3 34 W. <i>a</i>
May 12, 1884 -----	31 36	78 34 W.	0 00 --
May 24, 1884 -----	31 40	78 45 W.	0 06 E.
Aug. 26, 1883 -----	31 45	70 50 W.	3 51 W.
Aug. 8, 1883 -----	31 46	147 13 E.	0 48 W. <i>b</i>
June 18, 1884 -----	31 46	31 41 E.	5 27 W.
Oct. 10, 1881 -----	31 48	69 18 W.	8 24 W.
Oct. 5, 1883 -----	31 56	143 03 E.	1 07 W.
Aug. 8, 1883 -----	32 01	146 08 E.	1 36 W. <i>c</i>
Dec. 5, 1884 -----	32 16	127 26 E.	4 06 W.
Aug. 26, 1883 -----	32 19	71 44 W.	4 02 W.
Dec. 12, 1883 -----	32 27	69 08 W.	5 52 W.
Aug. 19, 1884 -----	32 31	69 48 W.	5 04 W. <i>d</i>
May 25, 1884 -----	32 32	127 27 E.	4 11 W.
Aug. 9, 1883 -----	32 36	143 44 E.	2 45 W.

58

a = Mean of observations on 16 equidistant points.

b = " " " " 24 " "

c = " " " " 28 " "

d = " " " " 8 " "

From 30° North to 35° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Juniata ----	Lt. E. H. C. Leutze ----	Lt. Diehl.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Diehl.
“ Vandalia ----	“ C. Belknap -----	“ Hubbard.
“ Ranger -----	“ W. P. Ray -----	“ Hubbard.
“ Tennessee --	“ S. W. Very -----	“ Scott.
“ Swatara ----	“ R. B. Peck -----	“ Scott.
“ Quinnebaug --	“ W. P. Day -----	“ Scott.
“ Richmond --	“ C. S. Sperry -----	“ C. S. Sperry.
“ Swatara ----	“ R. B. Peck -----	“ Scott.
“ Vandalia ----	“ C. Belknap -----	“ Diehl.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ W. H. Parker.
“ Richmond --	Lt. Com. E. S. Houston --	“ Diehl.
“ Trenton ----	“ T. A. Lyons --	Lt. Com. Lyons.
“ Pensacola --	Lt. F. Hanford -----	Lt. Diehl.
“ Essex -----	“ W. H. Parker -----	“ W. H. Parker.
“ Juniata ----	“ E. H. C. Leutze -----	“ Diehl.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Vandalia ----	“ C. Belknap -----	“ Diehl.
“ Richmond --	Lt. Com. E. S. Houston	“ Scott.
“ Juniata ----	Lt. E. H. C. Leutze ----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
April 16, 1884.....	32° 37'	25° 07' E.	7° 25' W.
Feb. 26, 1884	32 41	126 23 E.	4 53 W. <i>a</i>
Feb. 26, 1884	32 43	129 41 E.	4 13 W. <i>b</i>
April 19, 1883.....	32 45	78 41 W.	2 22 E.
April 22, 1884.....	32 46	28 56 E.	7 46 W.
June 11, 1883.....	32 52	67 13 W.	6 19 W.
April 12, 1884.....	32 55	14 05 E.	8 16 W.
May 24, 1884.....	32 55	125 29 E.	4 15 W.
June 20, 1884.....	33 03	25 36 E.	6 34 W.
Feb. 24, 1884.....	33 13	27 46 E.	7 05 W.
Aug. 27, 1883.....	33 14	72 43 W.	3 42 W.
Oct. 11, 1881.....	33 15	71 17 W.	6 54 W.
Oct. 11, 1884.....	33 15	124 25 E.	3 33 W.
June 19, 1884.....	33 16	27 20 E.	6 12 W.
Oct. 12, 1884.....	33 18	125 43 E.	3 41 W.
May 4, 1883.....	33 27	77 32 W.	0 58 W.
May 7, 1884.....	33 33	67 24 W.	8 36 W.
Aug. 10, 1883.....	33 34	141 40 E.	2 57 W.
July 20, 1884.....	33 42	136 34 E.	3 18 W.
July 21, 1884.....	33 46	12 29 W.	20 28 W.
Oct. 11, 1881.....	33 54	72 11 W.	7 28 W.
Nov. 5, 1882.....	34 05	121 00 W.	12 41 E.
June 1, 1884	34 05	133 30 E.	3 52 W. <i>c</i>

60

a = Mean of observations on 32 equidistant points.

b = " " " " 16 " "

c = " " " " 24 " "

From 30° North to 35° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Quinnebaug	Lt. W. P. Day -----	Lt. Scott.
“ Juniata -----	“ E. H. C. Leutze -----	“ Hubbard.
“ Alert -----	“ W. Swift -----	“ Hubbard.
“ Vandalia -----	“ C. Belknap -----	“ Hubbard.
“ Quinnebaug -----	“ W. P. Day -----	“ Scott.
“ Vandalia -----	“ C. Belknap -----	“ Hubbard.
“ Quinnebaug -----	“ W. P. Day -----	“ Scott.
“ Juniata -----	“ E. H. C. Leutze -----	“ Diehl.
“ Richmond --	Lt. Com. E. S. Houston--	“ Diehl.
“ Trenton -----	Lt. Asa Walker-----	“ Diehl.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Trenton -----	Lt. Com. T. A. Lyons --	Lt. Com. Lyons.
“ Juniata -----	Lt. E. H. C. Leutze-----	Lt. Diehl.
“ Richmond --	Lt. Com. E. S. Houston--	“ Diehl.
“ Juniata -----	Lt. E. H. C. Leutze-----	“ Diehl.
“ Yantic -----	“ E. S. Prime -----	“ Scott.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Juniata -----	“ E. H. C. Leutze -----	“ Diehl.
“ Richmond --	Lt. Com. E. S. Houston--	“ Diehl.
“ Trenton -----	“ T. A. Lyons --	Lt. Com. Lyons.
“ Ranger -----	Lt. W. P. Ray-----	Lt. Hubbard.
“ Essex -----	“ W. H. Parker -----	“ W. H. Parker.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Dec. 17, 1884-----	34° 09'	68° 48' W.	7° 43' W.
May 25, 1884-----	34 15	75 15 W.	3 40 W.
May 8, 1884-----	34 19	69 28 W.	7 40 W.
July 20, 1884-----	34 29	9 50 W.	19 11 W.
May 20, 1884-----	34 30	139 00 E.	0 24 W.
July 20, 1884 ----	34 33	9 32 W.	18 45 W. <i>a</i>
May 23, 1884-----	34 35	124 12 E.	3 49 W.
June 23, 1884-----	34 36	25 13 E.	6 43 W.
May 13, 1884-----	34 36	75 33 W.	4 39 W.
May 5, 1883-----	34 39	75 10 W.	3 01 W.
Oct. 23, 1883 ----	34 42	139 10 E.	3 53 W. <i>b</i>
Dec. 11, 1883-----	34 43	72 23 W.	6 01 W.
May 8, 1884-----	34 44	70 47 W.	6 48 W.
Feb. 27, 1884-----	34 46	124 41 E.	5 18 W.
March 1, 1883-----	34 51	22 54 E.	8 03 W.
June 4, 1884-----	34 54	73 34 W.	4 11 W.

62

a = Mean of observations on 8 equidistant points.

b = " " " " 16 " "

From 30° North to 35° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Swatara ----	Lt. R. B. Peck -----	Lt. Scott.
“ Vandalia ----	“ C. Belknap-----	“ Diehl.
“ Pensacola --	“ F. Hanford-----	“ Diehl.
“ Richmond --	Lt. Com. E. S. Houston--	“ Diehl.
“ Essex -----	Lt. W. H. Parker-----	“ Scott.
“ Richmond --	Lt. Com. E. S. Houston --	Lt. Com. Houston.
“ Juniata ----	Lt. E. H. C. Leutze----	Lt. Diehl.
“ Richmond --	Lt. Com. E. S. Houston--	“ Diehl.
“ Swatara ----	Lt. R. B. Peck -----	“ Scott.
“ Yantic -----	“ E. S. Prime-----	“ Scott.
“ Pensacola --	“ F. Hanford -----	“ F. Hanford.
“ Vandalia ----	“ C. Belknap-----	“ Diehl.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Juniata ----	“ E. H. C. Leutze----	“ Diehl.
“ Juniata ----	“ E. H. C. Leutze----	“ Diehl.
“ Jamestown --	“ R. G. Davenport----	“ Scott.
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North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Oct. 13, 1883-----	35° 04'	70° 55' W.	6° 37' W.
Dec. 11, 1882-----	35 08	44 42 W.	22 32 W.
Feb. 28, 1883-----	35 09	19 28 E.	9 09 W.
Dec. 12, 1882-----	35 10	40 14 W.	24 48 W.
June 5, 1884-----	35 10	73 21 W.	3 35 W.
Nov. 5, 1882-----	35 19	121 44 W.	12 37 E.
Oct. 12, 1881-----	35 21	73 57 W.	6 37 W.
June 24, 1884-----	35 22	22 04 E.	7 54 W.
April 30, 1885-----	35 25	17 02 E.	9 36 W. a
Nov. 23, 1882-----	35 26	139 39 E.	3 49 W. a
April 12, 1880-----	35 30	20 40 E.	11 43 W.
July 19, 1884-----	35 30	6 40 W.	16 53 W.
April 23, 1884-----	35 32	27 58 E.	8 47 W.
Dec. 22, 1883-----	35 46	125 37 E.	3 54 W. b
Dec. 10, 1882-----	35 47	47 20 W.	21 40 W.
Dec. 23, 1883-----	35 50	13 43 W.	20 45 W.
Dec. 2, 1882-----	36 02	64 50 W.	12 55 W.
Dec. 4, 1882-----	36 04	57 00 W.	15 53 W.
Jan. 23, 1883-----	36 06	5 22 W.	17 06 W. c
Dec. 13, 1882-----	36 09	35 50 W.	27 45 W.
June 13, 1884-----	36 12	4 34 W.	17 03 W.
Oct. 12, 1881-----	36 16	75 04 W.	4 33 W.
June 6, 1884-----	36 20	72 57 W.	4 31 W.

64

a = Mean of observations on 32 equidistant points.

b = " " " " 8 " "

c = " " " " 6 points.

From 35° North to 40° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Swatara----	Lt. R. B. Peck -----	Lt. Scott.
“ Juniata -----	“ E. H. C. Leutze-----	“ Diehl.
“ Juniata -----	“ E. H. C. Leutze-----	“ Diehl.
“ Juniata -----	“ E. H. C. Leutze-----	“ Diehl.
“ Jamestown -	“ R. G. Davenport----	“ Scott.
“ Ranger-----	“ W. P. Ray-----	“ Hubbard.
“ Trenton ----	Lt. Com. T. A. Lyons --	Lt. Com. Lyons.
“ Richmond --	“ E. S. Houston	Lt. Diehl.
“ Marion ----	Lt. J. W. Hagenman ---	“ Hagenman.
“ Richmond -	Lt. Com. E. S. Houston	Lt. Com. Houston.
“ Trenton ----	“ T. A. Lyons --	“ Lyons.
“ Richmond --	“ E. S. Houston	Lt. Diehl.
“ Quinnebaug	Lt. W. P. Day -----	“ Scott.
“ Enterprise	“ G. A. Norris -----	“ G. A. Norris.
“ Juniata -----	“ E. H. C. Leutze-----	“ Diehl.
“ Trenton ----	“ Asa Walker-----	“ Diehl.
“ Juniata -----	“ E. H. C. Leutze-----	“ Diehl.
“ Juniata -----	“ E. H. C. Leutze-----	“ Diehl.
“ Juniata ----	“ E. H. C. Leutze -----	“ Diehl.
“ Juniata -----	“ E. H. C. Leutze-----	“ Diehl.
“ Ossipee ----	“ J. A. Rodgers-----	“ Scott.
“ Trenton ----	Lt. Com. T. A. Lyons --	Lt. Com. Lyons.
“ Jamestown -	Lt. R. G. Davenport----	Lt. Scott.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Feb. 27, 1884-----	36° 22'	75° 08' W.	4° 13' W.
May 22, 1884-----	36 22	125 57 E.	4 27 W.
Sept. 30, 1883-----	36 30	6 47 W.	17 22 W.
June 25, 1884-----	36 30	19 00 E.	8 42 W. <i>a</i>
Sept. 30, 1883-----	36 34	7 42 W.	17 12 W.
Oct. 31, 1884-----	36 35	8 00 W.	18 16 W.
Oct. 19, 1883-----	36 38	3 04 W.	15 41 W.
June 14, 1884-----	36 38	1 03 W.	15 37 W.
Nov. 10, 1884-----	36 45	12 25 E.	10 07 W. <i>b</i>
Jan. 24, 1883-----	36 49	1 32 W.	16 46 W.
May 27, 1884-----	36 49	20 40 E.	8 20 W.
Nov. 16, 1884-----	36 50	1 42 W.	16 15 W.
Dec. 9, 1883-----	36 50	76 17 W.	2 39 W.
May 10, 1884-----	36 54	75 45 W.	3 37 W. <i>c</i>
Aug. 29, 1883-----	36 54	75 54 W.	3 35 W. <i>d</i>
Dec. 10, 1883-----	36 56	75 57 W.	3 39 W. <i>a</i>
Jan. 2, 1883-----	36 56	76 06 W.	3 10 W. <i>e</i>
June 30, 1883-----	36 57	76 02 W.	3 06 W. <i>d</i>
Dec. 16, 1884-----	36 58	70 03 W.	8 51 W.
June 16, 1881-----	37 00	76 10 W.	3 11 W. <i>f</i>
Oct. 10, 1884-----	37 00	76 06 W.	2 55 W. <i>a</i>
April 19, 1884-----	37 00	73 04 W.	6 17 W.
June 29, 1884-----	37 00	17 48 E.	9 06 W. <i>g</i>

66

a = Mean of observations on 8 equidistant points.

b = " " " " 28 " "

c = " " " " 16 " "

d = " " " " 24 " "

e = Mean of 3 results determined by one swinging with starboard helm, observations on 8 equidistant points, and two with port helm; observations on 16 and 8 equidistant points respectively.

f = Mean of two sets of observations on 24 equidistant points; starboard and port helm.

g = Mean of observations on 32 equidistant points.

From 35° North to 40° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Portsmouth	Lt. H. Winslow -----	Lt. Diehl.
“ Juniata ----	“ E. H. C. Leutze ----	“ Diehl.
“ Kearsarge --	“ A. Dunlap -----	“ Diehl.
“ Richmond -	Lt. Com. E. S. Houston	“ Hubbard.
“ Kearsarge	Lt. A. Dunlap -----	“ Diehl.
“ Lancaster --	“ H. N. Manney -----	“ Diehl.
“ Kearsarge --	“ A. Dunlap -----	“ Diehl.
“ Ossipee ----	“ J. A. Rodgers -----	“ Scott.
“ Quinneba'g	“ E. W. Sturdy ----	“ E. W. Sturdy.
“ Juniata ----	“ E. H. C. Leutze ----	“ Diehl.
“ Quinnebaug	“ W. P. Day -----	“ Scott.
“ Lancaster --	“ H. N. Manney -----	“ Diehl.
“ Vandalia ----	“ C. Belknap -----	“ Diehl.
“ Pensacola -	“ F. Hanford -----	“ F. Hanford.
“ Galena ----	“ H. W. Lyon -----	“ H. W. Lyon.
“ Vandalia --	“ C. Belknap -----	“ C. Belknap.
“ Enterprise	“ G. A. Norris -----	“ G. A. Norris.
“ Vandalia --	“ C. Belknap -----	“ C. Belknap.
“ Swatara ----	“ R. B. Peck -----	“ Scott.
“ Alliance --	“ C. P. Perkins -----	“ Scott.
“ Powhatan -	“ C. C. Cornwell ----	“ C. C. Cornwell.
“ Portsmouth	“ H. Winslow -----	“ Diehl.
“ Ossipee --	“ J. A. Rodgers ----	“ J. A. Rodgers.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Dec. 25, 1883 -----	37° 11'	11° 25' W.	20° 29' W.
April 11, 1880 -----	37 20	16 40 E.	11 10 W.
May 24, 1884 -----	37 25	15 04 W.	20 02 W. <i>a</i>
March 16, 1884 -----	37 27	126 33 E.	5 20 W.
Dec. 20, 1883 -----	37 27	24 07 W.	25 06 W.
Cct. 22, 1881 -----	37 28	75 03 W.	2 36 W.
Dec. 14, 1882 -----	37 35	31 53 W.	27 19 W.
Jan. 6, 1883 -----	37 35	17 13 W.	22 39 W.
Sept. 29, 1883 -----	37 42	9 25 W.	18 56 W.
June 16, 1884 -----	37 46	5 50 E.	13 49 W.
May 23, 1884 -----	37 50	18 18 W.	23 10 W.
June 7, 1884 -----	37 52	71 51 W.	7 00 W.
Dec. 26, 1883 -----	37 53	9 58 W.	20 03 W.
May 16, 1884 -----	38 05	34 58 W.	24 44 W.
May 16, 1884 -----	38 08	33 53 W.	24 06 W. <i>a</i>
June 21, 1884 -----	38 09	13 24 E.	10 34 W. <i>b</i>
July 13, 1881 -----	38 10	16 30 E.	9 30 W.
June 17, 1884 -----	38 11	9 05 E.	12 39 W.
May 20, 1884 -----	38 12	28 03 W.	24 15 W.
July 15, 1884 -----	38 15	71 41 W.	9 07 W.
July 20, 1883 -----	38 17	74 07 W.	6 14 W.
April 2, 1884 -----	38 18	10 12 E.	12 15 W. <i>b</i>
Jan. 27, 1883 -----	38 20	10 06 E.	12 25 W.

68

a = Mean of observations on 8 equidistant points.

b = " " " " 32 " "

From 35° North to 40° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Trenton ----	Lt. Asa Walker-----	Lt. Diehl.
“ Trenton ----	Lt. Com. T. A. Lyons --	Lt. Com. Lyons.
“ Ossipee ----	Lt. J. A. Rodgers ----	“ J. A. Rodgers.
“ Juniata ----	“ E. H. C. Leutze-----	Lt. Diehl.
“ Trenton ----	“ Asa Walker-----	“ Diehl.
“ Trenton ----	Lt. Com. T. A. Lyons --	Lt. Com. Lyons.
“ Juniata ----	Lt. E. H. C. Leutze-----	Lt. Diehl.
“ Juniata ----	“ E. H. C. Leutze-----	“ Diehl.
“ Kearsarge --	“ A. Dunlap-----	“ Diehl.
“ Ossipee ----	“ J. A. Rodgers-----	“ Scott.
“ Ossipee ----	“ J. A. Rodgers-----	“ Scott.
“ Jamestown --	“ R. G. Davenport-----	“ Scott.
“ Trenton ----	“ Asa Walker-----	“ Diehl.
“ Ossipee ----	“ J. A. Rodgers-----	“ Scott.
“ Ossipee ----	“ J. A. Rodgers ----	“ J. A. Rodgers.
“ Ossipee ----	“ J. A. Rodgers ----	“ J. A. Rodgers.
“ Trenton ----	Lt. Com. T. A. Lyons --	Lt. Com. Lyons.
“ Ossipee ----	Lt. J. A. Rodgers-----	Lt. Scott.
“ Ossipee ----	“ J. A. Rodgers-----	“ Scott.
“ Vandalia ----	“ C. Belknap-----	“ Diehl.
“ Vandalia ----	“ C. Belknap-----	“ Diehl.
“ Quinneba'g	“ W. P. Day -----	“ W. P. Day.
“ Juniata ----	“ E. H. C. Leutze-----	“ Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
May 21, 1884-----	38° 24'	24° 20' W.	23° 09' W.
July 15, 1884-----	38 24	71 45 W.	7 17 W.
Oct. 30, 1884-----	38 25	9 20 W.	19 22 W.
June 2, 1884-----	38 26	14 13 E.	11 12 W.
July 8, 1884-----	38 41	6 10 E.	13 03 W. <i>b</i>
June 3, 1884-----	38 44	11 24 E.	11 34 W.
July 14, 1884-----	38 48	71 24 W.	8 21 W.
Feb. 21, 1884-----	38 50	15 25 E.	9 53 W. <i>a</i>
July 15, 1884-----	38 51	71 34 W.	8 48 W.
Dec. 5, 1883-----	38 52	54 38 W.	19 13 W.
Jan. 26, 1883-----	38 52	6 18 E.	13 50 W.
Sept. 20, 1883-----	38 53	10 19 W.	18 15 W. <i>a</i>
July 27, 1881-----	38 56	17 32 E.	10 02 W. <i>b</i>
July 15, 1884-----	38 57	71 31 W.	8 47 W.
May 15, 1884-----	38 59	25 15 E.	5 54 W.
Dec. 6, 1883-----	39 00	51 36 W.	20 45 W.
Dec. 9, 1883-----	39 00	44 27 W.	22 57 W.
July 17, 1884-----	39 10	71 28 W.	8 33 W.
Nov. 18, 1884-----	39 10	3 24 E.	14 24 W. <i>a</i>
July 20, 1883-----	39 11	73 46 W.	7 07 W.
May 27, 1884-----	39 12	73 53 W.	7 16 W.
July 12, 1884-----	39 15	71 31 W.	8 44 W.
July 17, 1884-----	39 15	71 11 W.	9 16 W.

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a = Mean of observations on 16 equidistant points.

b = " " " " 32 " "

From 35° North to 40° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Ossipee ----	Lt. J. A. Rodgers-----	Lt. Scott.
“ Tennessee --	“ S. W. Very -----	“ Scott.
“ Lancaster --	“ H. N. Manney -----	“ Diehl.
“ Quinnebaug	“ W. P. Day -----	“ Scott.
“ Richmond --	Lt. Com. E. S. Houston -----	Lt. Com. Houston.
“ Quinnebaug	Lt. W. P. Day -----	Lt. Scott.
“ Tennessee --	“ S. W. Very -----	“ Scott.
“ Trenton --	“ Asa Walker -----	“ A. Walker.
“ Tennessee --	“ S. W. Very -----	“ Scott.
“ Trenton ----	“ Asa Walker -----	“ Diehl.
“ Juniata ----	“ E. H. C. Leutze-----	“ Diehl.
“ Kearsarge --	“ A. Dunlap -----	“ A. Dunlap.
“ Trenton --	Lt. Com. T. A. Lyons -----	Lt. Com. Lyons.
“ Tennessee --	Lt. S. W. Very -----	Lt. Scott.
“ Quinnebaug	“ W. P. Day -----	“ Scott.
“ Trenton ----	“ Asa Walker -----	“ Diehl.
“ Trenton ----	“ Asa Walker -----	“ Diehl.
“ Tennessee --	“ S. W. Very -----	“ Scott.
“ Lancaster --	“ H. N. Manney -----	“ H. N. Manney.
“ Vandalia ----	“ C. Belknap-----	Lt. Diehl.
“ Vandalia ----	“ C. Belknap-----	“ Diehl.
“ Tennessee --	“ S. W. Very -----	“ Scott.
“ Tennessee --	“ S. W. Very -----	“ Scott.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Sept. 19, 1883-----	39° 20'	11° 17' W.	18° 03' W.
July 14, 1884-----	39 23	70 58 W.	8 33 W.
July 12, 1884-----	39 30	71 53 W.	9 04 W.
July 18, 1884-----	39 30	71 02 W.	8 48 W.
July 19, 1883-----	39 31	64 18 W.	14 20 W.
July 18, 1884-----	39 31	71 49 W.	8 39 W.
Oct. 11, 1884-----	39 34	9 56 W.	19 30 W.
Sept. 11, 1883-----	39 38	25 26 W.	22 50 W.
Sept. 19, 1883-----	39 40	11 57 W.	20 17 W.
Aug. 29, 1883-----	39 43	56 02 W.	18 05 W.
Aug. 25, 1883-----	39 45	63 30 W.	12 50 W.
Aug. 26, 1883-----	39 45	60 52 W.	14 52 W.
Aug. 27, 1883-----	39 53	59 27 W.	17 53 W.
July 18, 1884-----	39 55	70 37 W.	12 17 W. ^a
Sept. 7, 1883-----	39 57	32 48 W.	25 27 W.
July 10, 1884-----	39 58	72 59 W.	8 08 W.
Sept. 9, 1883-----	39 59	28 58 W.	24 42 W.
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From 35° North to 40° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Kearsarge --	Lt. A. Dunlap-----	Lt. Diehl.
“ Tennessee --	“ S. W. Very -----	“ Scott.
“ Vandalia ---	“ C. Belknap-----	“ Diehl.
“ Tennessee --	“ S. W. Very -----	“ Scott.
“ Jamestown --	“ R. G. Davenport----	“ Scott.
“ Swatara ----	“ R. B. Peck -----	“ Scott.
“ Lancaster --	“ H. N. Manney -----	“ Diehl.
“ Kearsarge --	“ A. Dunlap-----	“ Diehl.
“ Kearsarge --	“ A. Dunlap-----	“ Diehl.
“ Kearsarge --	“ A. Dunlap-----	“ Diehl.
“ Kearsarge --	“ A. Dunlap-----	“ Diehl.
“ Kearsarge --	“ A. Dunlap-----	“ Diehl.
“ Kearsarge --	“ A. Dunlap-----	“ Diehl.
“ Alliance ---	“ J. C. Rich-----	“ Scott.
“ Kearsarge --	“ A. Dunlap-----	“ Diehl.
“ Tennessee --	“ S. W. Very -----	“ Scott.
“ Kearsarge --	“ A. Dunlap-----	“ Diehl.
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North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
July 18, 1884 ----	40° 00'	70° 36' W.	11° 01' W. <i>a</i>
July 18, 1884 ----	40 00	70 33 W.	10 43 W. <i>a</i>
July 5, 1884-----	40 00	12 16 E.	10 58 W.
Sept. 2, 1883 -----	40 00	42 24 W.	25 59 W.
Sept. 7, 1883 -----	40 00	33 58 W.	26 25 W.
Sept. 8, 1883 -----	40 00	30 18 W.	25 10 W.
July 10, 1884-----	40 01	73 06 W.	8 09 W.
Sept. 3, 1883 -----	40 01	41 21 W.	25 51 W.
Dec. 7, 1883-----	40 02	46 48 W.	23 46 W.
Sept. 4, 1883 -----	40 07	40 57 W.	25 22 W.
Sept. 5, 1883 -----	40 07	38 11 W.	25 45 W.
Sept. 5, 1883 -----	40 07	37 22 W.	25 57 W.
Sept. 6, 1883 -----	40 09	35 37 W.	25 04 W.
Sept. 1, 1883 ----	40 12	44 12 W.	24 52 W. <i>a</i>
Sept. 6, 1883 -----	40 13	36 24 W.	26 35 W.
Sept. 12, 1883-----	40 13	25 08 W.	22 44 W.
Sept. 15, 1883-----	40 17	21 44 W.	22 59 W.
Sept. 18, 1883-----	40 17	13 59 W.	21 00 W.
Sept. 13, 1883-----	40 18	24 22 W.	23 34 W.
Sept. 14, 1883-----	40 18	22 20 W.	22 40 W.
Sept. 14, 1883-----	40 19	22 55 W.	24 19 W.
Dec. 1, 1883 -----	40 21	73 52 W.	7 07 W. <i>a</i>
Dec. 2, 1883 -----	40 21	70 07 W.	11 06 W.

From 40° North to 45° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Vandalia ..	Lt. C. Belknap	Lt. C. Belknap.
“ Tennessee ..	“ S. W. Very	“ S. W. Very.
“ Richmond ..	Lt. Com. E. S. Houston	“ Diehl.
“ Kearsarge ..	Lt. A. Dunlap	“ Diehl.
“ Kearsarge ..	“ A. Dunlap	“ Diehl.
“ Kearsarge ..	“ A. Dunlap	“ Diehl.
“ Tennessee ..	“ S. W. Very	“ Scott.
“ Kearsarge ..	“ A. Dunlap	“ Diehl.
“ Trenton	“ Asa Walker	“ Diehl.
“ Kearsarge ..	“ A. Dunlap	“ Diehl.
“ Kearsarge ..	“ A. Dunlap	“ Diehl.
“ Kearsarge ..	“ A. Dunlap	“ Diehl.
“ Kearsarge ..	“ A. Dunlap	“ Diehl.
“ Kearsarge ..	“ A. Dunlap	“ Diehl.
“ Kearsarge ..	“ A. Dunlap	“ Diehl.
“ Kearsarge ..	“ A. Dunlap	“ Diehl.
“ Kearsarge ..	“ A. Dunlap	“ Diehl.
“ Kearsarge ..	“ A. Dunlap	“ Diehl.
“ Kearsarge ..	“ A. Dunlap	“ Diehl.
“ Kearsarge ..	“ A. Dunlap	“ Diehl.
“ Kearsarge ..	“ A. Dunlap	“ Diehl.
“ Kearsarge ..	“ A. Dunlap	“ Diehl.
“ Trenton	“ Asa Walker	“ A. Walker.
“ Trenton	“ Asa Walker	“ Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
June 8, 1884 -----	40° 22'	71° 24' W.	10° 14' W.
Aug. 22, 1883 -----	40 23	71 28 W.	8 30 W.
Aug. 22, 1883 -----	40 24	71 50 W.	8 09 W.
May 1, 1884 -----	40 26	73 51 W.	7 00 W. <i>a</i>
Aug. 21, 1883 -----	40 27	73 53 W.	5 58 W. <i>a</i>
Aug. 23, 1883 -----	40 28	70 38 W.	8 58 W.
Dec. 10, 1883 -----	40 29	43 53 W.	23 49 W.
Aug. 24, 1883 -----	40 29	73 51 W.	7 16 W. <i>b</i>
July 17, 1884 -----	40 30	73 50 W.	7 34 W. <i>c</i>
July 12, 1881 -----	40 30	13 08 E.	12 45 W.
Sept. 17, 1883 -----	40 33	15 40 W.	19 41 W.
Aug. 26, 1883 -----	40 34	72 47 W.	8 41 W.
April 15, 1881 -----	40 35	4 50 E.	14 05 W. <i>b</i>
Oct. 14, 1883 -----	40 42	74 00 W.	8 24 W.
July 28, 1883 -----	40 47	70 56 W.	10 57 W.
July 14, 1881 -----	40 48	18 06 E.	9 57 W.
May 3, 1884 -----	40 50	68 33 W.	13 19 W.
Dec. 15, 1883 -----	40 51	29 05 W.	26 47 W.
Aug. 13, 1883 -----	40 54	3 41 E.	14 28 W.
Dec. 11, 1883 -----	40 55	40 23 W.	26 36 W.
July 19, 1884 -----	41 00	69 26 W.	13 13 W.
May 3, 1884 -----	41 00	67 42 W.	13 31 W.
Oct. 8, 1883 -----	41 08	72 09 W.	8 35 W.

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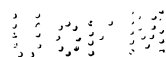
a = Mean of observations on 16 equidistant points.

b = " " " " 32 " "

c = " " " " 28 " "

From 40° North to 45° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Jamestown	Lt. R. G. Davenport	Lt. Scott.
“ Kearsarge	“ A. Dunlap	“ Diehl.
“ Kearsarge	“ A. Dunlap	“ Diehl.
G. R. S. Thetis	“ U. Sebree	“ U. Sebree.
U. S. S. Kearsarge	“ A. Dunlap	“ A. Dunlap.
“ Kearsarge	“ A. Dunlap	“ Diehl.
“ Trenton	“ Asa Walker	“ Diehl.
“ Swatara	“ R. B. Peck	“ R. B. Peck.
“ Swatara	“ R. B. Peck	“ Scott.
“ Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
“ Kearsarge	Lt. A. Dunlap	“ Diehl.
“ Swatara	“ R. B. Peck	“ Scott.
“ Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
“ Vandalia	Lt. C. Belknap	Lt. Diehl.
“ Vandalia	“ C. Belknap	“ Diehl.
“ Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
G. R. S. Thetis	Lt. U. Sebree	“ Diehl.
U. S. S. Trenton	“ Asa Walker	“ Diehl.
“ Lancaster	Lt. Com. J. M. Forsyth	“ Scott.
“ Trenton	Lt. Asa Walker	“ Diehl.
“ Vandalia	“ C. Belknap	“ Diehl.
G. R. S. Thetis	“ U. Sebree	“ Diehl.
U. S. S. Vandalia	“ C. Belknap	“ Diehl.



North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Feb. 3, 1884 -----	41° 15'	12° 51' E.	11° 23' W. <i>a</i>
July 31, 1881-----	41 15	12 46 E.	11 50 W.
May 13, 1884 -----	41 18	66 17 W.	15 18 W. <i>d</i>
July 29, 1883-----	41 18	66 41 W.	14 33 W.
Sept. 8, 1881-----	41 22	4 10 E.	15 30 W.
June 10, 1883 -----	41 29	70 12 W.	11 38 W. <i>a</i>
Nov. 17, 1884 -----	41 30	71 19 W.	10 52 W. <i>b</i>
Nov. 17, 1884 -----	41 30	71 19 W.	10 50 W. <i>b</i>
May 4, 1884-----	41 30	65 40 W.	15 10 W.
July 21, 1884-----	41 42	69 11 W.	13 22 W.
Sept. 24, 1883-----	41 50	63 27 W.	16 32 W.
May 4, 1884-----	42 00	64 21 W.	18 29 W.
Feb. 5, 1884 -----	42 05	11 45 E.	11 19 W. <i>c</i>
Oct. 18, 1884 -----	42 20	70 47 W.	11 31 W. <i>a</i>
June 16, 1883-----	42 23	66 33 W.	17 48 W.
May 5, 1884-----	42 34	62 12 W.	18 47 W.
July 26, 1881-----	42 38	15 42 E.	10 20 W.
Aug. 28, 1883-----	42 40	67 10 W.	15 44 W.
July 31, 1884-----	42 40	67 51 W.	14 46 W.
July 31, 1884-----	42 45	67 42 W.	14 51 W.
July 20, 1884-----	42 46	69 53 W.	13 56 W.
May 5, 1884-----	42 50	60 50 W.	20 47 W.
July 21, 1884-----	42 54	70 22 W.	12 19 W.

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a = Mean of observations on 16 equidistant points.

b = Mean of 10 observations taken on shore.

c = Mean of observations on 24 equidistant points.

d = Mean of two sets of observations on 16 equidistant points.

From 40° North to 45° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Lancaster	Lt. Com. J. M. Forsyth	Lt. Com. Forsyth.
“ Trenton ----	“ T. A. Lyons ----	Lt. Com. Lyons.
G. R. S. Alert ----	Lt. C. J. Badger ----	Lt. Diehl.
U. S. S. Vandalia ----	“ C. Belknap ----	“ Diehl.
“ Trenton ----	Lt. Com. T. A. Lyons ----	Lt. Com. Lyons.
“ Yantic ----	Lt. E. S. Prime ----	Lt. E. S. Prime.
-----	Lt. Com. T. A. Lyons ----	Lt. Com. Lyons.
-----	Lt. John Hubbard ----	Lt. Hubbard.
G. R. S. Thetis ----	“ U. Sebree ----	“ Diehl.
U. S. S. Swatara ----	“ R. B. Peck ----	“ Scott.
“ Yantic ----	“ E. S. Prime ----	“ Scott.
G. R. S. Thetis ----	“ U. Sebree ----	“ Diehl.
U. S. S. Kearsarge ----	“ W. Doty ----	“ W. Doty.
“ Powhatan ----	“ C. C. Cornwell ----	“ C. C. Cornwell.
“ Yantic ----	“ E. S. Prime ----	“ Scott.
G. R. S. Thetis ----	“ U. Sebree ----	“ Diehl.
U. S. S. Trenton ----	Lt. Com. T. A. Lyons ----	Lt. Com. Lyons.
“ Swatara ----	Lt. R. B. Peck ----	Lt. Scott.
G. R. S. Alert ----	“ C. J. Badger ----	“ Diehl.
“ Thetis ----	“ U. Sebree ----	“ Diehl.
U. S. S. Tennessee --	“ S. W. Very ----	“ Scott.
G. R. S. Thetis ----	“ U. Sebree ----	“ Diehl.
U. S. S. Tennessee --	“ S. W. Very ----	“ Scott.

North Latitude:

[illegible]

From 40° North to 45° North.

[illegible]

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Sept. 15, 1883 -----	45° 00'	61° 25' W.	23° 40' W.
June 19, 1883 -----	45 02	55 59 W.	29 21 W.
July 28, 1884 -----	45 09	57 24 W.	25 18 W.
May 7, 1884 -----	45 10	55 05 W.	28 31 W.
July 28, 1884 -----	45 20	57 26 W.	23 29 W.
Sept. 7, 1883 -----	45 29	61 02 W.	23 52 W.
Sept. 3, 1883 -----	45 30	73 33 W.	11 49 W.
Sept. 12, 1883 -----	45 33	61 02 W.	22 51 W.
July 27, 1884 -----	45 40	55 25 W.	28 02 W.
Sept. 3, 1883 -----	45 47	73 20 W.	12 25 W.
Sept. 14, 1883 -----	45 50	62 42 W.	22 02 W.
July 27, 1884 -----	45 57	55 25 W.	26 48 W.
May 8, 1884 -----	46 00	53 43 W.	29 06 W.
Sept. 9, 1883 -----	46 01	61 36 W.	23 14 W.
Aug. 23, 1883 -----	46 03	73 01 W.	14 04 W.
July 27, 1884 -----	46 08	54 15 W.	28 39 W.
Aug. 29, 1883 -----	46 10	62 18 W.	24 02 W. <i>a</i>
Sept. 22, 1883 -----	46 10	62 27 W.	24 19 W. <i>b</i>
Aug. 23, 1883 -----	46 13	72 47 W.	14 08 W.
Aug. 1, 1883 -----	46 32	56 46 W.	27 38 W.
Sept. 3, 1883 -----	46 45	72 20 W.	15 55 W.
Sept. 5, 1883 -----	46 48	71 12 W.	17 44 W.
Jan. 27, 1880 -----	46 50	8 14 W.	21 10 W. <i>c</i>

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a = Mean of observations on 16 equidistant points.

b = " " " " 8 " "

c = " " " " 32 " "

From 45° North to 50° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Vandalia --	Lt. C. Belknap-----	Lt. Hubbard.
“ Yantic-----	“ E. S. Prime-----	“ Scott.
G. R. S. Thetis -----	“ U. Sebree-----	“ Diehl.
“ Thetis -----	“ U. Sebree-----	“ Diehl.
“ Alert -----	“ C. J. Badger -----	“ Diehl.
U. S. S. Swatara-----	“ R. B. Peck -----	“ Scott.
“ Vandalia-----	“ C. Belknap -----	“ Hubbard.
“ Vandalia-----	“ C. Belknap -----	“ Hubbard.
G. R. S. Thetis -----	“ U. Sebree -----	“ Diehl.
U. S. S. Vandalia-----	“ C. Belknap -----	“ Hubbard.
“ Swatara-----	“ R. B. Peck -----	“ Scott.
G. R. S. Alert-----	“ C. J. Badger-----	“ Diehl.
“ Thetis -----	“ U. Sebree-----	“ Diehl.
U. S. S. Swatara-----	“ R. B. Peck -----	“ Scott.
“ Vandalia-----	“ C. Belknap -----	“ Hubbard.
G. R. S. Thetis -----	“ U. Sebree-----	“ Diehl.
U. S. S. Alliance -----	“ J. C. Rich -----	“ J. C. Rich.
“ Swatara -----	“ R. B. Peck -----	“ R. B. Peck.
“ Vandalia-----	“ C. Belknap -----	“ Hubbard.
“ Vandalia-----	“ C. Belknap -----	“ Hubbard.
“ Vandalia-----	“ C. Belknap -----	“ Hubbard.
“ Vandalia-----	“ C. Belknap -----	“ Hubbard.
“ Trenton ---	Lt. Com. T. A. Lyons ---	Lt. Com. Lyons.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
May 8, 1884 -----	46° 52'	52° 50' W.	29° 00' W.
July 26, 1884 -----	46 57	52 44 W.	29 18 W. <i>a</i>
July 26, 1884 -----	46 57	52 46 W.	30 16 W. <i>a</i>
July 26, 1884 -----	46 57	52 46 W.	30 12 W. <i>b</i>
Aug. 8, 1883 -----	47 00	56 40 W.	26 57 W.
Aug. 9, 1883 -----	47 03	59 13 W.	26 09 W.
Aug. 9, 1883 -----	47 07	60 16 W.	27 42 W.
Aug. 10, 1883 -----	47 10	61 25 W.	26 27 W.
Aug. 10, 1883 -----	47 10	62 10 W.	26 50 W.
Aug. 9, 1883 -----	47 13	60 25 W.	27 01 W.
Aug. 10, 1883 -----	47 18	62 23 W.	26 15 W.
Aug. 14, 1883 -----	47 21	70 16 W.	19 10 W.
Aug. 6, 1883 -----	47 28	55 30 W.	27 24 W.
June 29, 1881 -----	47 34	52 35 W.	30 26 W. <i>c</i>
Sept. 8, 1883 -----	47 51	62 48 W.	26 43 W.
Sept. 6, 1883 -----	47 57	69 35 W.	20 10 W.
May 23, 1884 -----	48 05	51 26 W.	30 43 W.
Aug. 13, 1883 -----	48 14	69 09 W.	20 51 W.
July 18, 1884 -----	48 14	52 04 W.	34 43 W.
Aug. 11, 1883 -----	48 36	63 30 W.	26 23 W.
Sept. 7, 1883 -----	48 37	68 32 W.	23 33 W.
Sept. 8, 1883 -----	48 43	63 53 W.	26 43 W.
Sept. 8, 1883 -----	48 50	64 20 W.	25 14 W.

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a = Mean of observations on 16 equidistant points.

b = " " " " 8 " "

c = Mean of 2 results obtained by swinging ship with starboard and port helm with observations on 32 and 16 equidistant points respectively.

From 45° North to 50° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
G. R. S. Thetis -----	Lt. U. Sebree -----	Lt. Diehl.
“ Bear -----	“ F. H. Crosby -----	“ F. H. Crosby.
“ Thetis -----	“ U. Sebree -----	“ U. Sebree.
“ Alert -----	“ C. J. Badger -----	“ C. J. Badger.
U. S. S. Vandalia -----	“ C. Belknap -----	“ Hubbard.
“ Vandalia -----	“ C. Belknap -----	“ Hubbard.
“ Vandalia -----	“ C. Belknap -----	“ Hubbard.
“ Vandalia -----	“ C. Belknap -----	“ Hubbard.
“ Vandalia -----	“ C. Belknap -----	“ Hubbard.
“ Vandalia -----	“ C. Belknap -----	“ Hubbard.
“ Vandalia -----	“ C. Belknap -----	“ Hubbard.
“ Vandalia -----	“ C. Belknap -----	“ Hubbard.
“ Alliance -----	“ C. P. Perkins -----	“ Scott.
“ Vandalia -----	“ C. Belknap -----	“ Hubbard.
“ Vandalia -----	“ C. Belknap -----	“ Hubbard.
G. R. S. Alert -----	“ C. J. Badger -----	“ Diehl.
U. S. S. Vandalia -----	“ C. Belknap -----	“ Hubbard.
G. R. S. Alert -----	“ C. J. Badger -----	“ Diehl.
U. S. S. Vandalia -----	“ C. Belknap -----	“ Hubbard.
“ Vandalia -----	“ C. Belknap -----	“ Hubbard.
“ Vandalia -----	“ C. Belknap -----	“ Hubbard.
“ Vandalia -----	“ C. Belknap -----	“ Hubbard.

North Latitude:

[illegible]

a = Mean of observations on 16 equidistant points.

From 45° North to 50° North.

[illegible]

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[illegible]

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
May 16, 1884 -----	55° 50'	51° 40' W.	43° 59' W.
July 13, 1884 -----	55 56	54 06 W.	42 43 W.
July 4, 1883. -----	56 03	50 55 W.	44 26 W.
June 29, 1883 -----	56 04	16 16 E.	9 53 W.
May 28, 1884 -----	56 11	49 42 W.	40 59 W.
Sept. 10, 1883 -----	56 34	52 24 W.	48 50 W.
July 13, 1884 -----	57 07	54 30 W.	44 46 W.
July 13, 1884 -----	57 08	54 21 W.	45 36 W.
June 29, 1883 -----	57 53	18 03 E.	9 22 W.
June 28, 1883 -----	58 30	18 34 E.	9 21 W.
June 12, 1884 -----	58 34	135 10 W.	30 31 E. <i>a</i>
July 12, 1884 -----	58 48	54 33 W.	46 19 W.
July 12, 1884 -----	58 50	54 36 W.	48 28 W.
May 17, 1884 -----	58 51	52 22 W.	49 51 W.
June 21, 1883 -----	59 20	22 34 E.	5 42 W.
July 12, 1884 -----	59 50	54 45 W.	51 42 W.
July 12, 1884 -----	59 51	54 48 W.	49 11 W.
July 12, 1884 -----	59 52	54 46 W.	47 14 W.
June 19, 1883 -----	59 59	29 46 E.	1 15 W. <i>a</i>
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From 55° North to 60° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
G. R. S. Thetis	Lt. U. Sebree	Lt. Diehl.
“ Thetis	“ U. Sebree	“ Diehl.
U. S. S. Yantic	“ E. S. Prime	“ Scott.
“ Lancaster	Lt. Com. J. M. Forsyth	“ Scott.
G. R. S. Alert	Lt. C. J. Badger	“ Diehl.
U. S. S. Yantic	“ E. S. Prime	“ Scott.
G. R. S. Bear	“ F. H. Crosby	“ Scott.
“ Thetis	“ U. Sebree	“ Diehl.
U. S. S. Lancaster	Lt. Com. J. M. Forsyth	“ Scott.
“ Lancaster	“ J. M. Forsyth	“ Scott.
“ Adams	Lt. D. Delehanty	“ D. Delehanty.
G. R. S. Thetis	“ U. Sebree	“ Diehl.
“ Alert	“ C. J. Badger	“ Diehl.
“ Thetis	“ U. Sebree	“ Diehl.
U. S. S. Lancaster	Lt. Com. J. M. Forsyth	“ Scott.
G. R. S. Alert	Lt. C. J. Badger	“ Diehl.
“ Bear	“ F. H. Crosby	“ Diehl.
“ Thetis	“ U. Sebree	“ Diehl.
U. S. S. Lancaster	Lt. Com. J. M. Forsyth	Lt. Com. Forsyth.
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North Latitude :

[illegible]

a = Mean of observations on 16 equidistant points.

b = Mean of two sets of observations on 28 equidistant points; starboard and port helm.

From 60° North to 65° North.

[illegible]

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
May 20, 1884 -----	65° 07'	54° 06' W.	62° 27' W.
July 10, 1884 -----	66 04	55 04 W.	63 47 W.
July 10, 1884 -----	66 05	55 00 W.	63 01 W.
July 8, 1883 -----	66 26	54 36 W.	64 26 W.
June 3, 1884 -----	67 19	54 45 W.	65 58 W.
May 21, 1884 -----	67 40	54 20 W.	63 43 W.
July 9, 1884 -----	67 57	54 34 W.	66 22 W. <i>a</i>
July 9, 1884 -----	67 57	55 35 W.	66 26 W.
July 9, 1884 -----	68 00	54 34 W.	67 27 W.
July 9, 1884 -----	68 02	54 32 W.	65 29 W. <i>b</i>
May 21, 1884 -----	68 19	54 25 W.	65 54 W.
July 9, 1884 -----	69 04	53 32 W.	65 09 W.
July 8, 1884 -----	69 14	53 24 W.	65 35 W. <i>c</i>
June 9, 1884 -----	69 25	54 45 W.	68 44 W. <i>d</i>
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94

a = Mean of observations on 16 equidistant points.

b = " " " " 32 " "

c = Determined by compass on shore.

d = Mean of 2 sets of observations on 16 equidistant points; starboard and port helm.

From 65° North to 70° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
G. R. S. Thetis	Lt. U. Sebree	Lt. Diehl.
“ Alert	“ C. J. Badger	“ Diehl.
“ Thetis	“ U. Sebree	“ Diehl.
U. S. S. Yantic	“ E. S. Prime	“ Scott.
G. R. S. Alert	“ C. J. Badger	“ Diehl.
“ Thetis	“ U. Sebree	“ Diehl.
“ Thetis	“ U. Sebree	“ Sebree.
“ Thetis	“ U. Sebree	“ Diehl.
“ Alert	“ C. J. Badger	“ Diehl.
“ Bear	“ F. H. Crosby	“ Scott.
“ Thetis	“ U. Sebree	“ Diehl.
“ Thetis	“ U. Sebree	“ Diehl.
“ Thetis	“ U. Sebree	“ Diehl.
“ Alert	“ C. J. Badger	“ Diehl.
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North Latitude:

[illegible]

96

a =	Mean of two sets of observations on 32 equidistant points; starboard and port helm.
b =	Mean of two sets of observations on 16 equidistant points; starboard and port helm.
c =	Mean of observations on 16 equidistant points.
d =	" " " " 28
e =	Determined by compass on ice, clear of ship.

From 70° North to 75° North.

[illegible]

North Latitude:

[illegible]

98

***a* = Determined by compass on ice, clear of ship.**

b = Mean of observations on 32 equidistant points.

\bar{c} = mean of observations on 32 equidistant points
 c = " " " " 16 " " "

d = Determined on shore.

\bar{a} = Mean of two sets of observations on 32 equidistant points; starboard and port helm.

From 75° North to 80° North.

[illegible]

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
June 1, 1883.-----	0° 07'	129° 38' W.	8° 06' E.
June 1, 1883 -----	0 22	129 04 W.	8 24 E.
Aug. 2, 1883.-----	0 50	127 22 W.	5 47 E.
Dec. 23, 1882-----	0 52	81 15 W.	7 51 E.
May 23, 1884.-----	0 52	59 13 E.	2 11 W.
May 31, 1883.-----	0 53	128 03 W.	7 24 E.
July 31, 1883 -----	1 00	30 49 W.	14 59 W.
Sept. 24, 1883 -----	1 03	105 02 E.	1 23 E. a
Dec. 3, 1884-----	1 07	29 04 W.	16 22 W.
May 31, 1883 -----	1 10	127 27 W.	7 36 E. b
Feb. 18, 1883 -----	1 14	27 14 W.	17 21 W.
Dec. 3, 1884-----	1 30	28 27 W.	17 00 W.
July 31, 1883 -----	1 34	30 40 W.	16 15 W.
May 30, 1883 -----	1 41	126 22 W.	7 36 E. b
Jan. 19, 1883 -----	1 49	81 11 W.	7 26 E.
May 30, 1883 -----	1 50	125 45 W.	7 23 E. c
April 6, 1882-----	1 53	7 40 W.	19 00 W.
Aug. 1, 1883 -----	2 08	126 18 W.	6 28 E.
May 29, 1883 -----	2 16	124 18 W.	7 03 E.
Dec. 2, 1884-----	2 24	27 23 W.	18 05 W.
May 29, 1883 -----	2 30	123 20 W.	7 33 E.
Dec. 2, 1884-----	2 46	26 46 W.	17 49 W.
May 28, 1883 -----	2 49	121 42 W.	7 06 E.

100

a = Mean of observations on 8 equidistant points.

b = " " " " 28 " "

c = Mean of seven observations.

1880

From the Equator to 5° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex -----	Lt. W. H. Parker -----	Lt. Diehl.
“ Essex -----	“ W. H. Parker -----	“ Diehl.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Richmond --	Lt. Com. E. S. Houston --	“ Diehl.
“ Essex -----	Lt. W. H. Parker -----	“ Diehl.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Juniata -----	“ E. H. C. Leutze -----	“ Diehl.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Essex -----	“ W. H. Parker -----	“ Diehl.
“ Enterprise --	“ G. A. Norris -----	“ Hubbard.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ W. H. Parker.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Aug. 30, 1883 -----	2° 50'	98° 00' E.	1° 30' E. <i>a</i>
July 30, 1883 -----	2 53	30 55 W.	16 48 W.
May 22, 1884 -----	2 54	60 31 E.	2 47 W.
Aug. 30, 1883 -----	3 04	98 26 E.	1 33 E. <i>a</i>
May 28, 1883 -----	3 04	120 40 W.	7 20 E.
May 22, 1884 -----	3 14	60 47 E.	1 26 W. <i>b</i>
Sept. 12, 1884 -----	3 17	106 11 E.	2 33 E. <i>c</i>
May 27, 1883 -----	3 39	118 51 W.	6 32 E.
Dec. 21, 1882 -----	3 41	81 50 W.	7 56 E.
May 21, 1884 -----	3 44	61 31 E.	2 56 W.
March 11, 1885 -----	3 44	81 26 W.	7 32 E.
Feb. 20, 1883 -----	3 47	28 39 W.	15 53 W.
Dec. 1, 1884 -----	3 49	24 52 W.	18 13 W. <i>c</i>
July 31, 1883 -----	3 49	123 29 W.	6 02 E.
July 30, 1883 -----	3 50	31 13 W.	16 18 W.
May 27, 1883 -----	4 00	117 54 W.	7 38 E.
April 7, 1884 -----	4 01	27 46 W.	18 24 W.
May 26, 1883 -----	4 30	116 10 W.	6 50 E.
Nov. 30, 1884 -----	4 35	23 38 W.	18 18 W.
July 30, 1883 -----	4 40	122 00 W.	6 21 E.
April 6, 1884 -----	4 50	26 10 W.	19 30 W.
May 26, 1883 -----	4 50	115 15 W.	8 22 E.
Nov. 30, 1884 -----	4 57	23 00 W.	18 16 W.

102

a = Mean of observations on 16 equidistant points.

b = " " " " 8 " "

c = " " " " 4 " "

From the Equator to 5° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Enterprise	Lt. G. A. Norris -----	Lt. G. A. Norris.
" Galena -----	" H. W. Lyon -----	" Diehl.
" Richmond --	Lt. Com. E. S. Houston	" Diehl.
" Enterprise	" G. A. Norris -----	" G. A. Norris.
" Essex -----	" W. H. Parker-----	" Hubbard.
" Richmond	Lt. Com. E. S. Houston	Lt. Com. Houston.
" Essex -----	Lt. W. H. Parker -----	Lt. Diehl.
" Essex -----	" W. H. Parker-----	" Hubbard.
" Pensacola --	" F. Hanford -----	" Diehl.
" Richmond --	Lt. Com. E. S. Houston--	" Diehl.
" Wachusett --	Lt. B. S. Richards-----	" Scott.
" Enterprise--	" G. A. Norris-----	" Hubbard.
" Essex -----	" W. Kellogg -----	" W. Kellogg.
" Pensacola --	" F. Hanford -----	" Diehl.
" Galena -----	" H. W. Lyon -----	" Diehl.
" Essex -----	" W. H. Parker-----	" Hubbard.
" Pensacola --	" F. Hanford -----	" Diehl.
" Essex -----	" W. H. Parker-----	" Hubbard.
" Essex -----	" W. Kellogg -----	" Scott.
" Pensacola --	" F. Hanford -----	" Diehl.
" Pensacola --	" F. Hanford -----	" Diehl.
" Essex -----	" W. H. Parker-----	" Hubbard.
" Essex -----	" W. Kellogg -----	" Scott.

South Latitude:

[illegible]

From the Equator to 5° South.

[illegible]

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
July 30, 1883 -----	5° 08'	121° 12' W.	6° 13' E.
Sept. 6, 1883 -----	5 10	106 24 E.	2 00 E.
May 20, 1884 -----	5 18	64 00 E.	2 15 W.
May 25, 1883 -----	5 22	113 21 W.	7 39 E.
July 29, 1883 -----	5 22	32 01 W.	15 49 W.
Feb. 1, 1884 -----	5 25	81 23 W.	8 28 E. <i>a</i>
May 25, 1883 -----	5 30	112 45 W.	7 25 E.
Nov. 29, 1884 -----	5 45	21 39 W.	19 17 W.
July 29, 1883 -----	5 52	118 54 W.	7 36 E.
May 24, 1883 -----	6 00	111 19 W.	8 08 E.
April 15, 1882 -----	6 01	19 58 W.	18 52 W.
Jan. 31, 1884 -----	6 12	81 26 W.	8 36 E.
Nov. 29, 1884 -----	6 13	21 16 W.	19 17 W.
May 24, 1883 -----	6 13	110 39 W.	8 18 E. <i>a</i>
May 19, 1884 -----	6 18	65 42 E.	2 15 W.
July 28, 1883 -----	6 18	117 03 W.	7 44 E.
Feb. 22, 1883 -----	6 21	30 51 W.	15 20 W.
July 28, 1883 -----	6 24	116 25 W.	7 53 E.
May 23, 1883 -----	6 32	109 21 W.	9 00 E. <i>a</i>
April 4, 1884 -----	6 36	22 28 W.	20 20 W.
July 28, 1883 -----	6 38	32 09 W.	15 01 W.
May 23, 1883 -----	6 39	108 33 W.	8 36 E.
Sept. 16, 1884 -----	6 40	104 19 E.	3 22 E.

From 5° South to 10° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Pensacola --	Lt. F. Hanford -----	Lt. Diehl.
“ Juniata -----	“ E. H. C. Leutze -----	“ Diehl.
“ Richmond --	Lt. Com. E. S. Houston --	“ Diehl.
“ Essex -----	Lt. W. H. Parker -----	“ Hubbard.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Lackaw'na -----	“ J. M. Miller -----	“ J. M. Miller.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Essex -----	“ W. H. Parker -----	“ Hubbard
“ Lackawa'na -----	“ J. M. Miller -----	“ Diehl.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Essex -----	“ W. H. Parker -----	“ W. H. Parker.
“ Richmond --	Lt. Com. E. S. Houston --	“ Diehl.
“ Pensacola --	Lt. F. Hanford -----	“ Diehl.
“ Enterprise --	“ G. A. Norris -----	“ Hubbard.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Diehl.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Essex -----	“ W. H. Parker -----	“ Scott.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
July 27, 1883 -----	6° 42'	113° 57' W.	7° 25' E.
May 18, 1884 -----	6 47	66 16 E.	2 16 W.
Jan. 30, 1884 -----	6 50	81 16 W.	8 55 E.
Nov. 28, 1884 -----	7 07	19 36 W.	19 18 W.
July 25, 1883 -----	7 19	109 23 W.	7 19 E.
May 2, 1884 -----	7 20	102 20 E.	1 47 E.
March 9, 1885 -----	7 21	80 51 W.	8 06 E.
Dec. 19, 1882 -----	7 21	81 27 W.	9 45 E.
May 22, 1883 -----	7 23	106 07 W.	9 13 E.
July 24, 1883 -----	7 26	107 38 W.	7 20 E. <i>a</i>
Nov. 28, 1884 -----	7 31	19 12 W.	19 52 W.
July 23, 1883 -----	7 41	104 58 W.	8 05 E.
May 17, 1884 -----	7 43	67 54 E.	2 26 W.
Sept. 17, 1884 -----	7 44	101 24 E.	3 24 E.
May 4, 1884 -----	7 44	96 56 E.	1 51 E.
April 2, 1884 -----	7 45	19 20 W.	21 48 W. <i>a</i>
May 21, 1883 -----	7 49	104 10 W.	10 16 E.
May 21, 1883 -----	7 54	103 20 W.	9 02 E.
May 5, 1884 -----	7 56	94 37 E.	0 54 W.
May 6, 1884 -----	7 56	92 07 E.	0 50 W.
May 6, 1884 -----	7 56	91 15 E.	0 49 W. <i>b</i>
Dec. 20, 1883 -----	7 57	41 47 E.	9 33 W. <i>c</i>
July 22, 1883 -----	8 01	101 35 W.	9 15 E.

108

a = Mean of observations on 16 equidistant points.

b = " " " " 8 " "

c = Mean of two sets of observations on 8 equidistant points.

From 5° South to 10° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Pensacola --	Lt. F. Hanford-----	Lt. Diehl.
“ Richmond --	Lt. Com. E. S. Houston--	“ Diehl.
“ Lackawa'na	Lt. J. M. Miller-----	“ Diehl.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Richmond --	Lt. Com. E. S. Houston--	“ Diehl.
“ Wachusett --	Lt. B. S. Richards-----	“ Scott.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Essex -----	“ W. H. Parker-----	“ Hubbard.
“ Pensacola --	“ F. Hanford -----	“ F. Hanford.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Richmond --	Lt. Com. E. S. Houston--	“ Diehl.
“ Essex -----	Lt. W. H. Parker-----	“ Scott.
“ Richmond --	Lt. Com. E. S. Houston--	“ Diehl.
“ Pensacola --	“ F. Hanford -----	“ F. Hanford.
“ Essex -----	“ W. H. Parker-----	“ Diehl.
“ Essex -----	“ W. H. Parker-----	“ Diehl.
“ Richmond --	Lt. Com. E. S. Houston--	“ Diehl.
“ Richmond --	“ E. S. Houston--	“ Diehl.
“ Richmond --	“ E. S. Houston -----	“ Hubbard.
“ Brooklyn --	Lt. E. W. Watson-----	“ E. W. Watson.
“ Pensacola --	“ F. Hanford -----	“ Diehl.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
May 20, 1883 -----	8° 08'	101° 44' W.	9° 27' E.
Feb. 23, 1883 -----	8 09	31 13 W.	14 25 W.
May 20, 1883 -----	8 11	100 45 W.	9 34 E.
July 21, 1883 -----	8 21	98 50 W.	9 38 E.
Nov. 27, 1884 -----	8 27	17 44 W.	21 34 W.
May 16, 1884 -----	8 30	69 12 E.	2 16 W.
May 19, 1883 -----	8 30	99 03 W.	10 09 E.
Dec. 24, 1883 -----	8 31	102 38 E.	1 43 E.
May 19, 1883 -----	8 32	98 20 W.	10 09 E.
Feb. 25, 1885 -----	8 34	79 46 W.	8 27 E.
July 20, 1883 -----	8 34	95 59 W.	9 44 E.
Dec. 19, 1883 -----	8 44	43 29 E.	9 33 W. <i>a</i>
Jan. 27, 1884 -----	8 49	80 39 W.	10 06 E.
May 8, 1884 -----	8 50	85 58 E.	0 55 W.
Dec. 24, 1883 -----	8 50	101 58 E.	0 07 E.
May 18, 1883 -----	8 51	96 33 W.	10 30 E.
May 15, 1884 -----	8 59	70 06 E.	1 26 W.
Dec. 17, 1882 -----	9 00	80 03 W.	9 53 E.
Aug. 26, 1884 -----	9 02	140 09 W.	7 10 E. <i>a</i>
May 18, 1883 -----	9 06	95 36 W.	10 28 E.
July 27, 1883 -----	9 11	33 36 W.	4 28 W. <i>b</i>
March 8, 1885 -----	9 17	79 25 W.	9 14 E.
March 31, 1884 -----	9 19	16 20 W.	22 31 W.

110

a = Mean of observations on 32 equidistant points.

b = " " " " 24 " "

From 5° South to 10° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex -----	Lt. W. H. Parker-----	Lt. Hubbard.
“ Enterprise--	“ G. A. Norris -----	“ Hubbard.
“ Essex -----	“ W. H. Parker-----	“ Hubbard.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Richmond --	Lt. Com. E. S. Houston--	“ Diehl.
“ Essex -----	“ W. H. Parker-----	“ Hubbard.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Essex -----	“ W. H. Parker-----	“ Hubbard.
“ Wachusett --	“ B. S. Richards-----	“ Scott.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Brooklyn--	“ E. W. Watson-----	“ E. W. Watson.
“ Lackawa'na	“ J. M. Miller-----	“ Diehl.
“ Richmond --	Lt. Com. E. S. Houston--	“ Diehl.
“ Pensacola --	Lt. F. Hanford -----	“ Diehl.
“ Essex -----	“ W. H. Parker-----	“ Hubbard.
“ Richmond --	Lt. Com. E. S. Houston--	“ Diehl.
“ Pensacola --	Lt. F. Hanford -----	“ Diehl.
“ Iroquois ---	“ F. W. Crocker -----	“ Scott.
“ Essex -----	“ W. H. Parker-----	“ Hubbard.
“ Galena -----	“ H. W. Lyon-----	“ H. W. Lyon.
“ Wachusett--	“ B. S. Richards-----	“ Scott.
“ Pensacola --	“ F. Hanford-----	“ Diehl.

South Latitude:

[illegible]

α = Mean of observations on 32 equidistant points.

b = " " " " 8 " "

From 5° South to 10° South.

[illegible]

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Aug. 23, 1884 -----	10° 02'	139° 00' W.	7° 51' E.
Feb. 26, 1885 -----	10 04	78 48 W.	9 10 E.
Jan. 26, 1884 -----	10 06	80 32 W.	10 10 E.
April 8, 1882 -----	10 10	24 48 W.	17 22 W.
Dec. 26, 1883 -----	10 11	98 30 E.	0 13 E.
Sept. 19, 1884 -----	10 13	94 04 E.	1 39 E.
Feb. 24, 1883 -----	10 25	32 14 W.	15 08 W.
May 14, 1883 -----	10 36	86 53 W.	10 00 E. <i>a</i>
Aug. 22, 1884 -----	10 37	137 41 W.	8 30 E.
Aug. 28, 1884 -----	10 39	142 25 W.	7 52 E.
Dec. 27, 1883 -----	10 43	96 36 E.	0 04 E.
July 26, 1883 -----	10 44	34 44 W.	13 17 W.
March 29, 1884 -----	10 44	14 05 W.	22 50 W.
May 13, 1883 -----	10 45	83 51 W.	10 42 E. <i>b</i>
Aug. 21, 1884 -----	10 48	135 56 W.	8 55 E.
Aug. 15, 1884 -----	10 50	123 58 W.	7 19 E.
Aug. 17, 1884 -----	10 52	123 39 W.	7 28 E.
Aug. 20, 1884 -----	10 54	134 00 W.	8 15 E.
May 12, 1883 -----	10 55	82 16 W.	10 20 E. <i>c</i>
March 7, 1885 -----	10 56	78 19 W.	9 46 E.
Aug. 14, 1884 -----	10 57	121 24 W.	8 03 E.
Aug. 18, 1884 -----	10 58	129 50 W.	7 05 E.
Aug. 19, 1884 -----	11 01	131 43 W.	7 34 E.

114

a = Mean of observations on 28 equidistant points.

b = Mean of 8 observations.

c = " " 16 "

From 10° South to 15° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Iroquois----	Lt. F. W. Crocker-----	Lt. Scott.
“ Wachusett ..	“ B. S. Richards-----	“ Scott.
“ Lackawan'a..	“ J. M. Miller -----	“ Diehl.
“ Essex -----	“ W. H. Parker-----	“ Hubbard.
“ Pensacola ..	“ F. Hanford -----	“ Diehl.
“ Essex -----	“ W. H. Parker-----	“ Scott.
“ Enterprise..	“ G. A. Norris-----	“ Hubbard.
“ Essex -----	“ W. H. Parker -----	“ W. H. Parker.
“ Iroquois----	“ F. W. Crocker-----	“ Scott.
“ Iroquois----	“ F. W. Crocker-----	“ Scott.
“ Pensacola ..	“ F. Hanford -----	“ Diehl.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Pensacola ..	“ F. Hanford -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Iroquois----	“ F. W. Crocker-----	“ Scott.
“ Iroquois----	“ F. W. Crocker-----	“ Scott.
“ Iroquois----	“ F. W. Crocker-----	“ Scott.
“ Iroquois----	“ F. W. Crocker-----	“ Scott.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Wachusett ..	“ B. S. Richards-----	“ Scott.
“ Iroquois----	“ F. W. Crocker-----	“ Scott.
“ Iroquois----	“ F. W. Crocker-----	“ Scott.
“ Iroquois----	“ F. W. Crocker-----	“ Scott.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Aug. 11, 1884 -----	11° 02'	113° 40' W.	7° 58' E.
Dec. 15, 1882 -----	11 02	78 27 W.	10 19 E.
Aug. 8, 1884 -----	11 13	106 45 W.	9 25 E.
Aug. 9, 1884 -----	11 14	108 50 W.	9 03 E.
Sept. 20, 1884 -----	11 20	90 38 E.	1 10 E.
Aug. 29, 1884 -----	11 22	143 33 W.	7 24 E.
Aug. 6, 1884 -----	11 27	103 22 W.	8 46 E.
Aug. 5, 1884 -----	11 31	102 15 W.	9 22 E.
March 6, 1885 -----	11 31	77 54 W.	9 11 E.
July 23, 1884 -----	11 33	87 04 W.	10 29 E.
July 30, 1884 -----	11 33	90 47 W.	9 59 E.
Aug. 4, 1884 -----	11 34	101 03 W.	8 57 E.
July 27, 1884 -----	11 34	86 01 W.	10 48 E.
July 26, 1883 -----	11 35	35 22 W.	12 32 W.
March 28, 1884 -----	11 36	12 43 W.	23 06 W.
Aug. 2, 1884 -----	11 37	98 24 W.	9 03 E.
July 31, 1884 -----	11 47	93 49 W.	10 27 E.
Aug. 30, 1884 -----	12 00	144 15 W.	7 56 E.
Dec. 14, 1882 -----	12 00	77 13 W.	9 40 E. α
Sept. 22, 1884 -----	12 00	83 46 E.	0 01 W.
Sept. 25, 1884 -----	12 07	74 14 E.	2 22 W.
Sept. 24, 1884 -----	12 09	77 24 E.	2 39 W.
Jan. 24, 1884 -----	12 15	80 13 W.	10 12 E.

From 10° South to 15° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Iroquois----	Lt. F. W. Crocker-----	Lt. Scott.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Iroquois-----	“ F. W. Crocker-----	“ Scott.
“ Iroquois-----	“ F. W. Crocker-----	“ Scott.
“ Essex -----	“ W. H. Parker-----	“ Scott.
“ Iroquois-----	“ F. W. Crocker-----	“ Scott.
“ Iroquois-----	“ F. W. Crocker-----	“ Scott.
“ Iroquois-----	“ F. W. Crocker-----	“ Scott.
“ Wachusett --	“ B. S. Richards-----	“ Scott.
“ Iroquois-----	“ F. W. Crocker-----	“ Scott.
“ Iroquois-----	“ F. W. Crocker-----	“ Scott.
“ Iroquois-----	“ F. W. Crocker-----	“ Scott.
“ Iroquois-----	“ F. W. Crocker-----	“ Scott.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Pensacola --	“ F. Hanford -----	“ Diehl.
“ Iroquois-----	“ F. W. Crocker-----	“ Scott.
“ Iroquois-----	“ F. W. Crocker-----	“ Scott.
“ Iroquois-----	“ F. W. Crocker-----	“ Scott.
“ Pensacola --	“ F. Hanford -----	“ F. Hanford
“ Essex -----	“ W. H. Parker-----	“ Scott.
“ Essex -----	“ W. H. Parker-----	“ Scott.
“ Essex -----	“ W. H. Parker-----	“ Scott.
“ Lackawa'na--	“ J. M. Miller -----	“ Diehl.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Oct. 2, 1884 -----	12° 18'	56° 22' E.	7 02 W. <i>a</i>
Oct. 1, 1884-----	12 21	59 04 E.	5 37 W.
April 21, 1882-----	12 30	27 21 W.	15 42 W.
April 25, 1884-----	12 50	11 37 W.	21 19 W.
July 22, 1883 ----	12 58	38 30 W.	10 37 W. <i>c</i>
July 25, 1883-----	13 00	37 04 W.	10 08 W.
June 30, 1883 ----	13 10	48 25 E.	9 47 W. <i>b</i>
Sept. 21, 1884-----	13 13	169 27 W.	9 20 E.
Feb. 25, 1883 ----	13 18	33 15 W.	13 51 W. <i>b</i>
June 29, 1883 ----	13 26	48 18 E.	10 10 W. <i>b</i>
Oct. 6, 1884-----	13 30	46 15 E.	9 23 W.
April 24, 1882-----	13 35	30 18 W.	15 42 W.
Dec. 1, 1883-----	13 40	76 59 W.	9 30 E.
Sept. 20, 1884-----	13 50	167 33 W.	8 37 E.
Sept. 19, 1884-----	14 00	166 39 W.	8 36 E.
Nov. 23, 1884-----	14 04	9 21 W.	22 41 W.
Sept. 18, 1884-----	14 07	165 42 W.	8 46 E.
Oct. 7, 1884 -----	14 08	42 23 E.	12 26 W. <i>a</i>
March 25, 1884-----	14 22	8 37 W.	24 19 W.
Dec. 30, 1883-----	14 25	91 03 E.	1 20 W.
Jan. 21, 1884-----	14 27	79 50 W.	10 23 E.
Sept. 17, 1884-----	14 31	163 31 W.	8 14 E.
Nov. 23, 1884-----	14 33	8 36 W.	22 57 W.

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a = Mean of observations on 8 equidistant points.

b = " " " 16 " "

c = Mean of 22 observations taken on shore and at anchor.

From 10° South to 15° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex -----	Lt. W. H. Parker -----	Lt. W. H. Parker.
“ Essex -----	“ W. H. Parker -----	“ Scott.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Galena -----	“ H. W. Lyon -----	“ Diehl
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Enterprise -----	“ G. A. Norris -----	“ G. A. Norris.
“ Iroquois -----	“ F. W. Crocker -----	“ Scott.
“ Enterprise -----	“ G. A. Norris -----	“ G. A. Norris.
“ Enterprise -----	“ G. A. Norris -----	“ G. A. Norris.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Wachusett -----	“ B. S. Richards -----	“ Scott.
“ Iroquois -----	“ F. W. Crocker -----	“ Scott.
“ Iroquois -----	“ F. W. Crocker -----	“ Scott.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Iroquois -----	“ F. W. Crocker -----	“ Scott.
“ Essex -----	“ W. H. Parker -----	“ W. H. Parker.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Lackawa'na -----	“ J. M. Miller -----	“ Diehl.
“ Iroquois -----	“ F. W. Crocker -----	“ Scott.
“ Essex -----	“ W. Kellogg -----	“ Scott.

South Latitude:

[illegible]

From 10° South to 15° South.

[illegible]

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Oct. 25, 1884-----	15° 00'	40° 55' E.	12° 04' W.
Sept. 14, 1884-----	15 03	158 11 W.	8 19 E.
Jan. 5, 1884-----	15 04	76 52 E.	4 35 W.
March 24, 1884-----	15 06	6 58 W.	24 35 W.
April 25, 1883-----	15 10	76 28 W.	10 00 E.
Jan 7, 1884-----	15 12	73 14 E.	4 51 W.
Jan. 8, 1884-----	15 23	71 19 E.	5 37 W.
Feb. 27, 1883-----	15 28	33 52 W.	12 19 W.
Oct. 16, 1882-----	15 34	75 45 W.	11 27 E.
Sept. 12, 1884-----	15 35	153 35 W.	8 47 E.
Jan. 9, 1884-----	15 39	69 10 E.	5 44 W.
Oct. 2, 1884-----	15 42	172 20 W.	8 35 E.
Jan. 20, 1884-----	15 43	79 22 W.	11 52 E.
Feb. 27, 1884-----	15 43	74 36 W.	11 41 E.
Sept. 1, 1884-----	15 50	147 35 W.	8 13 E.
May 6, 1884-----	15 51	5 53 W.	24 49 W. ^a
Nov. 30, 1883-----	16 06	76 43 W.	10 03 E.
May 6, 1884-----	16 08	6 16 W.	24 18 W. ^a
Oct. 3, 1884-----	16 13	175 09 W.	8 26 E.
Jan. 11, 1884-----	16 17	64 19 E.	6 51 W.
April 23, 1884-----	16 20	5 20 W.	25 55 W.
Feb. 28, 1883-----	16 22	33 41 W.	13 16 W.
Oct. 25, 1884-----	16 30	40 20 E.	13 53 W.

From 15° South to 20° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex -----	Lt. W. Kellogg -----	Lt. Scott.
“ Iroquois -----	“ F. W. Crocker -----	“ Scott.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Enterprise -----	“ G. A. Norris -----	“ Hubbard.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Iroquois -----	“ F. W. Crocker -----	“ Scott.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Iroquois -----	“ F. W. Crocker -----	“ Scott.
“ Lackawa'na -----	“ J. M. Miller -----	“ Diehl.
“ Wachusett -----	“ B. S. Richards -----	“ Scott.
“ Iroquois -----	“ F. W. Crocker -----	“ Scott.
“ Brooklyn -----	“ E. W. Watson -----	“ Diehl.
“ Wachusett -----	“ B. S. Richards -----	“ Scott.
“ Brooklyn -----	“ E. W. Watson -----	“ Diehl.
“ Iroquois -----	“ F. W. Crocker -----	“ Scott.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Brooklyn -----	“ E. W. Watson -----	“ Diehl.
“ Enterprise -----	“ G. A. Norris -----	“ Hubbard.
“ Essex -----	“ W. Kellogg -----	“ Scott.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Oct. 15, 1882 -----	16° 43'	74° 09' W.	10° 58' E.
Feb. 28, 1884 -----	16 44	72 39 W.	12 06 E.
July 18, 1883 -----	16 47	38 09 W.	10 48 W.
May 9, 1884 -----	16 58	8 54 W.	24 25 W.
Jan. 12, 1884 -----	17 02	61 56 E.	7 15 W.
March 20, 1884 -----	17 02	4 21 W.	24 55 W.
April 23, 1883 -----	17 06	74 02 W.	10 43 E.
Nov. 19, 1884 -----	17 15	4 02 W.	24 30 W. <i>a</i>
Oct. 26, 1884 -----	17 33	39 33 E.	14 12 W.
Jan. 16, 1884 -----	17 33	53 48 E.	10 06 W.
Jan. 15, 1884 -----	17 35	56 00 E.	9 48 W.
Jan. 13, 1884 -----	17 37	59 47 E.	8 15 W.
Jan. 14, 1884 -----	17 41	57 57 E.	8 44 W.
March 1, 1883 -----	17 42	33 21 W.	13 34 W.
Oct. 14, 1882 -----	17 43	72 26 W.	11 07 E.
May 11, 1884 -----	17 46	11 35 W.	24 14 W.
Feb. 29, 1884 -----	17 48	71 19 W.	12 05 E.
Aug. 15, 1883 -----	17 49	78 18 W.	11 05 E.
Jan. 18, 1884 -----	18 01	49 44 E.	11 57 W.
Oct. 13, 1882 -----	18 14	71 10 W.	9 17 E.
Nov. 29, 1883 -----	18 17	76 05 W.	11 18 E.
March 19, 1884 -----	18 34	2 24 W.	25 31 W.
May 12, 1884 -----	18 37	13 28 W.	23 29 W.

From 15° South to 20° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex -----	Lt. W. H. Parker-----	Lt. Hubbard.
“ Wachusett ---	“ B. S. Richards-----	“ Scott.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Brooklyn ---	“ E. W. Watson-----	“ Diehl.
“ Pensacola ---	“ F. Hanford -----	“ Diehl.
“ Pensacola ---	“ F. Hanford -----	“ Diehl.
“ Pensacola ---	“ F. Hanford -----	“ Diehl.
“ Essex -----	“ W. Kellogg -----	“ W. Kellogg.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Pensacola ---	“ F. Hanford -----	“ Diehl.
“ Pensacola ---	“ F. Hanford -----	“ Diehl.
“ Pensacola ---	“ F. Hanford -----	“ Diehl.
“ Pensacola ---	“ F. Hanford -----	“ Diehl.
“ Enterprise--	“ G. A. Norris-----	“ Hubbard.
“ Essex -----	“ W. H. Parker-----	“ Hubbard.
“ Brooklyn ---	“ E. W. Watson-----	“ Diehl.
“ Wachusett ---	“ B. S. Richards-----	“ Scott.
“ Wachusett ---	“ B. S. Richards-----	“ Scott.
“ Pensacola ---	“ F. Hanford -----	“ Diehl.
“ Essex -----	“ W. H. Parker-----	“ Hubbard.
“ Wachusett ---	“ B. S. Richards-----	“ Scott.
“ Pensacola ---	“ F. Hanford -----	“ Diehl.
“ Brooklyn ---	“ E. W. Watson-----	“ Diehl.

South Latitude:

[illegible]

From 15° South to 20° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Galena -----	Lt. H. W. Lyon -----	Lt. Diehl.
“ Lackawa’na -----	“ J. W. Carlin -----	“ Diehl.
“ Enterprise -----	“ G. A. Norris -----	“ Hubbard.
“ Brooklyn -----	“ E. W. Watson -----	“ Diehl.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Wachusett -----	“ B. S. Richards -----	“ Scott.
“ Brooklyn -----	“ E. W. Watson -----	“ Diehl.
“ Iroquois -----	“ F. W. Crocker -----	“ Scott.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Enterprise -----	“ G. A. Norris -----	“ Hubbard.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
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South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
July 16, 1883 -----	20° 08'	39° 05' W.	9° 25' W.
Jan. 16, 1884 -----	20 17	77 40 W.	14 07 E.
July 16, 1883 -----	20 20	39 13 W.	9 37 W.
June 17, 1883 -----	20 21	44 07 E.	15 52 W. <i>a</i>
Nov. 27, 1883 -----	20 39	75 29 W.	11 12 E.
May 15, 1884 -----	20 47	18 03 W.	22 27 W.
Oct. 14, 1884 -----	20 57	174 17 E.	10 15 E.
March 4, 1883 -----	21 06	31 06 W.	13 21 W.
May 16, 1884 -----	21 09	18 58 W.	21 58 W.
Jan. 15, 1884 -----	21 20	77 00 W.	14 11 E.
June 16, 1883 -----	21 29	43 03 E.	17 07 W.
Oct. 3, 1882 -----	21 32	70 47 W.	12 56 E.
July 15, 1883 -----	21 34	39 52 W.	8 24 W.
May 17, 1884 -----	21 35	20 00 W.	21 46 W.
Nov. 17, 1884 -----	21 43	1 29 E.	25 34 W.
Nov. 26, 1883 -----	21 56	75 01 W.	11 13 E.
March 5, 1883 -----	22 25	29 49 W.	11 25 W.
July 14, 1883 -----	22 34	40 45 W.	6 53 W.
May 18, 1884 -----	22 35	22 14 W.	20 33 W.
Sept. 28, 1883 -----	22 44	70 59 W.	10 55 E.
March 15, 1884 -----	22 49	2 49 E.	27 10 W.
Aug. 13, 1883 -----	22 50	78 56 W.	12 43 E.
July 14, 1883 -----	22 54	41 26 W.	6 51 W.

From 20° South to 25° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Galena -----	Lt. H. W. Lyon -----	Lt. Diehl.
“ Lackawa’na -----	“ J. M. Miller -----	“ Diehl.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Enterprise -----	“ G. A. Norris -----	“ G. A. Norris.
“ Wachusett -----	“ B. S. Richards -----	“ Scott.
“ Brooklyn -----	“ E. W. Watson -----	“ Diehl.
“ Iroquois -----	“ F. W. Crocker -----	“ Scott.
“ Enterprise -----	“ G. A. Norris -----	“ Hubbard.
“ Brooklyn -----	“ E. W. Watson -----	“ Diehl.
“ Lackawa’na -----	“ J. M. Miller -----	“ Diehl.
“ Enterprise -----	“ G. A. Norris -----	“ Hubbard.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Brooklyn -----	“ E. W. Watson -----	“ Diehl.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Wachusett -----	“ B. S. Richards -----	“ Scott.
“ Enterprise -----	“ G. A. Norris -----	“ Hubbard.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Brooklyn -----	“ E. W. Watson -----	“ Diehl.
“ Lackawa’na -----	“ J. W. Carlin -----	“ Diehl.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Wachusett -----	“ B. S. Richards -----	“ Scott.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
May 18, 1884 -----	22° 58'	23° 03' W.	19° 41' W.
April 29, 1882 -----	23 10	39 08 W.	7 47 W.
June 15, 1883 -----	23 19	43 32 E.	17 43 W. <i>a</i>
Nov. 25, 1883 -----	23 36	74 38 W.	12 49 E.
April 15, 1883 -----	23 37	70 57 W.	11 28 E.
July 13, 1883 -----	23 47	42 37 W.	6 44 W.
Nov. 16, 1884 -----	23 47	4 48 E.	25 45 W.
March 5, 1884 -----	23 52	42 38 E.	19 14 W.
Jan. 13, 1884 -----	24 05	75 45 W.	14 14 E.
July 13, 1883 -----	24 24	43 08 W.	5 50 W.
Nov. 2, 1884 -----	24 25	45 17 W.	2 56 W.
March 7, 1883 -----	24 35	28 20 W.	16 35 W.
May 24, 1884 -----	24 45	30 48 W.	14 26 W.
March 7, 1883 -----	24 54	28 18 W.	16 02 W.
Aug. 11, 1883 -----	24 55	79 07 W.	14 06 E.

From 20° South to 25° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Brooklyn---	Lt. E. W. Watson-----	Lt. Diehl.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Enterprise -----	“ G. A. Norris -----	“ G. A. Norris.
“ Wachusett -----	“ B. S. Richards-----	“ Scott.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Galena-----	“ H. W. Lyon -----	“ Diehl.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Brooklyn-----	“ E. W. Watson-----	“ Diehl.
“ Lackawa’na-----	“ J. M. Miller -----	“ Diehl.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Nipsic-----	“ C. H. Arnold -----	“ Diehl.
“ Enterprise-----	“ G. A. Norris-----	“ Hubbard.
“ Brooklyn-----	“ E. W. Watson-----	“ Diehl.
“ Enterprise-----	“ G. A. Norris-----	“ Hubbard.
“ Wachusett -----	“ B. S. Richards-----	“ Scott.
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South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Nov. 24, 1883 -----	25° 00'	74° 14' W.	12° 50' E.
Oct. 29, 1884 -----	25 00	36 16 E.	18 53 W.
March 8, 1883 -----	25 27	28 10 W.	15 34 W.
March 12, 1884 -----	25 32	6 54 E.	28 03 W.
May 24, 1884 -----	25 55	31 17 W.	14 20 W.
July 11, 1883 -----	26 00	43 27 W.	4 28 W.
March 25, 1884 -----	26 02	32 18 W.	13 43 W.
Nov. 15, 1884 -----	26 05	7 10 E.	25 53 W.
May 26, 1884 -----	26 06	32 53 W.	12 33 W.
Feb. 1, 1884 -----	26 11	48 55 E.	18 40 W.
May 27, 1884 -----	26 23	34 09 W.	11 48 W.
March 9, 1883 -----	26 31	27 42 W.	15 26 W.
July 11, 1883 -----	26 40	43 56 W.	4 45 W.
April 16, 1884 -----	27 16	10 16 E.	27 53 W.
May 28, 1884 -----	27 16	36 11 W.	10 51 W.
Nov. 14, 1884 -----	27 18	8 49 E.	26 00 W.
March 10, 1884 -----	27 20	71 08 W.	14 10 E.
Oct. 30, 1884 -----	27 25	35 56 E.	20 31 W.
March 11, 1884 -----	27 30	9 20 E.	28 21 W.
Nov. 15, 1884 -----	27 44	48 12 W.	1 18 W.
July 10, 1883 -----	27 51	45 02 W.	3 36 W.
Nov. 14, 1884 -----	27 51	9 38 E.	26 11 W.
Nov. 23, 1883 -----	28 03	73 33 W.	13 53 E.

From 25° South to 30° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Wachusett	Lt. B. S. Richards	Lt. Scott.
“ Essex	“ W. Kellogg	“ Scott.
“ Enterprise	“ G. A. Norris	“ Hubbard.
“ Pensacola	“ F. Hanford	“ Diehl.
“ Brooklyn	“ E. W. Watson	“ Diehl.
“ Galena	“ H. W. Lyon	“ Diehl.
“ Brooklyn	“ E. W. Watson	“ Diehl.
“ Essex	“ W. Kellogg	“ Scott.
“ Brooklyn	“ E. W. Watson	“ Diehl.
“ Pensacola	“ F. Hanford	“ Diehl.
“ Brooklyn	“ E. W. Watson	“ Diehl.
“ Enterprise	“ G. A. Norris	“ Hubbard.
“ Galena	“ H. W. Lyon	“ Diehl.
“ Brooklyn	“ E. W. Watson	“ Diehl.
“ Brooklyn	“ E. W. Watson	“ Diehl.
“ Essex	“ W. Kellogg	“ Scott.
“ Wachusett	“ B. S. Richards	“ Scott.
“ Essex	“ W. Kellogg	“ Scott.
“ Pensacola	“ F. Hanford	“ Diehl.
“ Nipsic	“ C. H. Arnold	“ Diehl.
“ Galena	“ H. W. Lyon	“ Diehl.
“ Essex	“ W. Kellogg	“ Scott.
“ Wachusett	“ B. S. Richards	“ Scott.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
May 5, 1882-----	28° 13'	43° 19' W.	1° 53' W.
Sept. 29, 1882-----	28 15	72 41 W.	14 15 E.
Oct. 2, 1883-----	28 19	71 49 W.	13 16 E.
Feb. 4, 1884-----	28 19	40 2 E.	22 07 W.
Oct. 30, 1884-----	28 19	33 14 E.	21 26 W.
March 10, 1883-----	28 25	27 26 W.	15 41 W.
Feb. 5, 1884-----	28 29	39 16 E.	24 56 W.
July 10, 1883-----	28 34	45 40 W.	1 45 W.
Feb. 6, 1884-----	28 42	37 45 E.	24 15 W.
May 30, 1884-----	28 46	39 44 W.	7 30 W.
April 15, 1884-----	28 49	10 31 E.	28 24 W.
March 10, 1883-----	28 51	27 27 W.	15 24 W. <i>a</i>
March 10, 1884-----	28 57	11 19 E.	28 26 W.
May 30, 1884-----	29 10	40 41 W.	5 29 W.
Nov. 13, 1884-----	29 37	11 59 E.	26 19 W.
April 11, 1883-----	29 56	71 19 W.	13 42 E. <i>b</i>

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a = Mean of observations on 16 equidistant points.

b = " " " " 8 " "

From 25° South to 30° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex -----	Lt. W. H. Parker-----	Lt. Hubbard.
“ Essex -----	“ W. H. Parker-----	“ Hubbard.
“ Lackawa’na-----	“ J. W. Carlin-----	“ Diehl.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Enterprise-----	“ G. A. Norris -----	“ Hubbard.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Galena -----	“ H. W. Lyon-----	“ Diehl.
“ Pensacola -----	“ F. Hanford -----	“ Diehl.
“ Brooklyn-----	“ E. W. Watson-----	“ Diehl.
“ Brooklyn-----	“ E. W. Watson-----	“ Diehl.
“ Enterprise -----	“ G. A. Norris -----	“ G. A. Norris.
“ Pensacola -----	“ F. Hanford-----	“ Diehl.
“ Brooklyn-----	“ E. W. Watson-----	“ Diehl.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Pensacola -----	“ F. Hanford -----	“ F. Hanford.
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South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Nov. 16, 1884 -----	30° 00'	48° 42' W.	0° 12' W.
July 9, 1883 -----	30 06	47 02 W.	0 02 W.
May 31, 1884 -----	30 13	42 54 W.	4 03 W.
March 12, 1883 --	30 18	26 48 W.	14 51 W. a
March 12, 1883 --	30 23	25 58 W.	16 00 W. a
Oct. 2, 1883 -----	30 29	72 04 W.	14 22 E.
July 9, 1883 -----	30 30	47 45 W.	1 25 E.
March 9, 1884 -----	30 31	13 10 E.	28 52 W.
Nov. 22, 1883 -----	30 33	72 46 W.	15 40 E.
May 31, 1884 -----	30 38	43 50 W.	2 15 W.
April 14, 1884 -----	30 42	12 54 E.	28 39 W.
Nov. 16, 1884 -----	30 45	49 08 W.	0 59 W.
March 17, 1883 -----	30 46	12 56 W.	25 53 W.
March 16, 1883 -----	30 58	17 38 W.	23 24 W.
May 9, 1882 -----	31 12	46 07 W.	0 10 E.
Oct 31, 1884 -----	31 13	30 50 E.	25 48 W.
March 20, 1883 -----	31 39	11 10 W.	24 15 W.
July 8, 1883 -----	31 54	48 30 W.	1 44 E.
March 8, 1884 -----	32 10	15 24 E.	28 59 W.
March 24, 1883 --	32 24	1 11 W.	27 21 W. a
March 23, 1883 --	32 26	3 17 W.	26 37 W. b
Oct. 21, 1883 -----	32 34	12 03 W.	24 11 W.
April 13, 1884 -----	32 41	16 01 E.	29 09 W.

136

a = Mean of observations on 16 equidistant points.

b = " " " " 4 " "

From 30° South to 35° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Nipsic -----	Lt. C. H. Arnold -----	Lt. Diehl.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Brooklyn ---	“ E. W. Watson -----	“ Diehl.
“ Enterprise ---	“ G. A. Norris -----	“ G. A. Norris.
“ Enterprise ---	“ G. A. Norris -----	“ G. A. Norris.
“ Lackawanna ---	“ J. W. Carlin -----	“ Diehl.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Pensacola ---	“ F. Hanford -----	“ Diehl.
“ Wachusett ---	“ B. S. Richards -----	“ Scott.
“ Brooklyn ---	“ E. W. Watson -----	“ Diehl.
“ Brooklyn ---	“ E. W. Watson -----	“ Diehl.
“ Nipsic -----	“ C. H. Arnold -----	“ Scott.
“ Enterprise ---	“ G. A. Norris -----	“ Hubbard.
“ Enterprise ---	“ G. A. Norris -----	“ Hubbard.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Enterprise ---	“ G. A. Norris -----	“ Hubbard.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Pensacola ---	“ F. Hanford -----	“ Diehl.
“ Enterprise ---	“ G. A. Norris -----	“ G. A. Norris.
“ Enterprise ---	“ G. A. Norris -----	“ G. A. Norris.
“ Brooklyn ---	“ E. W. Watson -----	“ Diehl.
“ Brooklyn ---	“ E. W. Watson -----	“ Diehl.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Oct. 22, 1883 -----	32° 46'	8° 44' W.	24° 44' W.
Nov. 1, 1884 -----	32 52	29 14 E.	28 19 W.
March 10, 1884 -----	32 58	28 36 E.	29 14 W.
Nov. 11, 1884 -----	33 00	17 14 E.	28 37 W. <i>a</i>
Nov. 20, 1883 -----	33 01	71 38 W.	15 07 E. <i>a</i>
Dec. 18, 1883 -----	33 01	71 37 W.	15 41 E. <i>b</i>
Oct. 23, 1883 -----	33 05	7 05 W.	25 49 W.
May 12, 1882 -----	33 25	49 14 W.	5 51 E.
March 7, 1884 -----	33 40	17 39 E.	30 00 W. <i>c</i>
Nov. 18, 1884 -----	33 40	52 16 W.	3 52 E.
Oct. 19, 1883 -----	33 42	14 10 W.	22 14 W.
July 21, 1882 -----	33 48	73 20 W.	18 04 E.
May 13, 1882 -----	33 58	50 27 W.	4 37 E.
Nov. 19, 1884 -----	34 00	52 03 W.	4 26 E.
July 7, 1883 -----	34 00	51 00 W.	3 59 E.
March 28, 1883 --	34 03	13 40 E.	29 06 W. <i>c</i>
Oct. 24, 1883 -----	34 24	3 34 W.	26 17 W.
Feb. 17, 1884 -----	34 31	24 24 E.	28 36 W.
Dec. 22, 1882 -----	34 58	56 15 W.	7 54 E. <i>d</i>
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138

a = Mean of observations on 8 equidistant points.

b = " " " " 32 " "

c = " " " " 16 " "

d = Mean of four sets with observations on 32, 24, 16 and 32 equidistant points respectively.

From 30° South to 35° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Brooklyn---	Lt. E. W. Watson-----	Lt. Diehl.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Brooklyn---	“ E. W. Watson-----	“ Diehl.
“ Essex -----	“ W. Kellogg -----	“ Scott.
“ Wachusett -----	“ B. S. Richards -----	“ Hubbard.
“ Lackaw'na -----	“ J. W. Carlin -----	“ J. W. Carlin.
“ Brooklyn---	“ E. W. Watson-----	“ Diehl.
“ Essex -----	“ W. H. Parker-----	“ Hubbard.
“ Pensacola -----	“ F. Hanford -----	“ F. Hanford.
“ Nipsic-----	“ C. H. Arnold -----	“ Scott.
“ Brooklyn---	“ E. W. Watson-----	“ Diehl.
“ Essex -----	“ W. H. Parker-----	“ Hubbard.
“ Essex -----	“ W. H. Parker-----	“ Hubbard.
“ Nipsic-----	“ C. H. Arnold -----	“ Scott.
“ Galena -----	“ H. W. Lyon -----	“ Diehl.
“ Enterprise -----	“ G. A. Norris -----	“ G. A. Norris.
“ Brooklyn---	“ E. W. Watson-----	“ Diehl.
“ Pensacola ---	“ F. Hanford -----	“ Diehl.
“ Galena -----	“ H. W. Lyon -----	“ H. W. Lyon.
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South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
June 5, 1884 -----	35° 00'	55° 47' W.	7° 48' E. <i>a</i>
March 7, 1883 -----	35 04	56 07 W.	7 58 E. <i>b</i>
Dec. 19, 1884 -----	35 07	56 10 W.	7 56 E. <i>c</i>
July 20, 1882-----	35 07	75 08 W.	22 03 E.
Oct. 25, 1883 -----	35 10	56 40 W.	8 34 E. <i>d</i>
Oct. 31, 1883-----	35 15	7 04 E.	29 22 W.
Nov. 20, 1883-----	35 15	19 30 E.	30 26 W.
Jan. 15, 1885 -----	36 24	175 19 E.	13 42 E. <i>e</i>
Oct 15, 1883-----	36 40	20 47 W.	17 35 W.
Jan. 4, 1883-----	36 42	55 08 W.	8 38 E.
June 11, 1882-----	37 07	55 19 W.	7 47 E.
Oct. 6, 1883-----	37 19	37 27 W.	5 14 W.
Dec. 22, 1882-----	37 39	55 12 W.	8 31 E.
Feb. 1, 1883-----	37 39	55 40 W.	9 21 E.
Oct. 14, 1883-----	37 42	22 44 W.	15 35 W.
Nov. 27, 1883-----	38 05	42 36 E.	28 35 W.
Oct. 3, 1883-----	38 10	45 44 W.	3 04 E.
Oct. 2, 1883-----	38 20	48 21 W.	4 42 E.
Jan. 5, 1883-----	38 41	56 09 W.	10 04 E.
Feb. 1, 1883-----	38 45	56 44 W.	9 21 E.
Dec. 21, 1882-----	39 37	57 24 W.	10 22 E.
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140

a = Mean of observations on 8 equidistant points.

b = Mean of four sets of observations on 32 equidistant points.

c = Mean of observations on 16 equidistant points.

d = Mean of two sets with observations on 16 and 32 equidistant points; star-board and port helm.

e = Mean of observations on 24 equidistant points.

From 35° South to 40° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Brooklyn ---	Lt. E. W. Watson ----	Lt. E. W. Watson.
“ Brooklyn ---	“ E. W. Watson ----	“ E. W. Watson.
“ Nipsic -----	“ C. H. Arnold -----	“ C. H. Arnold.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Nipsic -----	“ C. H. Arnold -----	“ C. H. Arnold.
“ Brooklyn ---	“ E. W. Watson -----	“ Diehl.
“ Brooklyn ---	“ E. W. Watson -----	“ Diehl.
“ Iroquois ---	“ F. W. Crocker ----	“ F. W. Crocker.
“ Brooklyn ---	“ E. W. Watson -----	“ Diehl.
“ Brooklyn ---	“ E. W. Watson -----	“ Diehl.
“ Essex -----	“ W. H. Parker -----	“ Hubbard.
“ Brooklyn ---	“ E. W. Watson -----	“ Diehl.
“ Brooklyn ---	“ E. W. Watson -----	“ Diehl.
“ Brooklyn ---	“ E. W. Watson -----	“ Diehl.
“ Brooklyn ---	“ E. W. Watson -----	“ Diehl.
“ Brooklyn ---	“ E. W. Watson -----	“ Diehl.
“ Brooklyn ---	“ E. W. Watson -----	“ Diehl.
“ Brooklyn ---	“ E. W. Watson -----	“ Diehl.
“ Brooklyn ---	“ E. W. Watson -----	“ Diehl.
“ Brooklyn ---	“ E. W. Watson -----	“ Diehl.
“ Brooklyn ---	“ E. W. Watson -----	“ Diehl.
“ Brooklyn ---	“ E. W. Watson -----	“ Diehl.
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South Latitude:

[illegible]

From 40° South to 45° South.

[illegible]

South Latitude.

[illegible]

α = Mean of observations on 12 equidistant points.

From 45° South to 50° South.

[illegible]

South Latitude:

[illegible]

a = Mean of observations on 32 equidistant points.

b = " " " " 16 " "

